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[n these 'pages dimension and weight are expressed in terms of the Metric System, and temperature in degrees of the Centigrade Scale.]

Original Lectures.

ARTICLE I.

A CLINICAL LECTURE UPON THE OPERATION FOR INVERSION OF THE LOWER EYELID. By F. C. HOTZ, M.D. Delivered at the Illinois Charitable Eye and Ear Infirmary, November 13, 1879.

GENTLEMEN: In comparing the right and left eye of this patient, you will notice a remarkable difference in the appearance of the lower eyelids. While the left lower eyelid appears normal in every way, the right one seems to be reduced to an unsightly thick piece of integument. You cannot dectect any eyelashes, you cannot see anything like the free edge of the lid. It looks as if the whole lid had been destroyed, and the external integument were drawn inward by the cicatrization and directly united with the conjunctiva. But now let me press slightly upon this rounded border of the skin, and you will perceive a great transformation; as if I had touched a secret spring, the lid border together with the eyelashes suddenly turn up from behind the skin; and now the right lower eyelid looks just like

its partner, with the cilia well developed and grown in a regular row from a smooth, clean-cut edge. If I discontinue the pressure upon the skin, the lid border with its eyelashes slowly sinks down again, to disappear behind the skin which rolls in after it.

We have here a typical case of a complete inversion of the lower lid. It is rolled in upon itself in such manner that its free edge and eyelashes are turned down toward, and buried in, the lower cul-de-sac of the conjunctiva. The patient informed me that he had been afflicted with granular conjunctivitis for twenty years, and that the right lower lid had been inverted for at least six or seven years. I mention these data, because the chronicity of the affection, in connection with the readiness with which the lid turns in again after it has been everted, and the absence of spasms of the orbicular muscle—these facts must lead us to suppose that organic changes have taken place in the tissues which compose this lower lid, of such a character that the inversion is a permanent condition. It is, therefore, beyond the influence of medicinal application; nor would it be materially affected by our curing of the granular conjunctivitis, if such a thing were possible under the circumstances. But as long as the inverted eyelashes continue their mechanical irritation of the conjunctiva, so long any treatment of the conjunctival disease will meet with little or no success. The first step, therefore, in dealing with a case like this, is to remedy the entropion, because thereby we remove one of the greatest obstacles to a successful treatment of the granular conjunctivitis.

The common practice in cases of chronic, confirmed inversion of the lower eyelid, which require operative treatment, is either to excise one transverse fold or several longitudinal folds of the integument of the lid, or to insert through the basis of a transverse fold two or three ligatures. The wounds created by the removal of skin are allowed to heal by granulation; and the ligatures, being drawn as tightly as possible, remain in place until they are eliminated by suppuration. Thus, either by scissors or by ligatures, wounds are inflicted upon the skin of the lower lid, which are repaired by granulation tissue. Cicatricial tissue, resulting from such wounds, always shrinks a good deal, drawing with an irresistible force the surrounding tissues toward the center of

the scar, or, if one end of the scar is attached to some immovable substance, toward this fixed point. In the case of the lower lid, the scars established by the operations mentioned are connected, above with the free edge of the lid, and below with the integument of the cheek. By the cicatricial contraction, therefore, these two parts are drawn toward each other, and, if the integument of the cheek be firm and comparatively unyielding, the lid border, on account of its great mobility, becomes principally affected by the cicatricial tension. From its normal position it would be drawn away so as to become everted; but if inverted it may perhaps be turned just enough to recover its normal position.

You will have perceived, gentlemen, that the theory underlying all these operations, is to employ the contracture of cicatricial tissues as the power with which the reposition of the inverted eyelid shall be accomplished. This end, however, is quite often not attained, because, as I think, there are two very serious defects in the plan upon which these operations are executed.

1. *The effect of the operation depends upon the contraction of cicatricial tissues.* That is to say, we have to rely upon one unknown quantity, an x, as mathematicians call it. For we cannot know how much or how little the scar of a granulating wound of a certain length or width may shrink; we have no influence upon this shrinkage; we can neither increase nor arrest it. We entrust, therefore, the ultimate result of our operation to an agency which is entirely beyond our control; and consequently we must not be surprised at all if our calculation, based upon one x, shows up a different result from that which we bargained for.

2. *The result of these operations is too dependent upon the state of the integument of the cheek.* This is a worse fault than the other, because it makes, in most cases, a permanent success illusory. Let us review the mechanical effect of the operation: By excision or ligation, the skin of the lower lid is shortened in the longitudinal direction for the purpose of making the requisite traction upon the edge of the inverted eyelid to turn it back to its proper position. But, in order to make this traction

effectively and successfully, the opposite end of the contracting cicatricial band must be firmly and immovably fixed; if it is not, the traction will operate upon both ends, and the greater degree of mobility alone will decide which will be moved the most. If the integument of the cheek, to which the lower end of the cicatricial band is attached, is solid and firm, it forms a pretty good basis for the traction. But let that integument be very flaccid, as we find it in aged people; let at the same time the lid be held inverted by extensive atrophic shrinkage of the conjunctiva, and the traction of the cicatricial band will draw the flaccid and movable skin of the cheek upward rather than the lid border downward. And this is just the condition which obtains in many cases of inversion of the lower lid. For this deformity occurs particularly often among old people, on account of the great relaxation of their integument.

To overcome, under these circumstances, an entropion of the lower lid by excision or ligation is a very difficult task; to secure a permanent success, almost an impossibility. I remember very well yet an old woman who was an inmate of the infirmary two years ago. Her lower lids were inverted, though not nearly so badly as in the case before you; but her skin was exceedingly thin and flabby. I excised a transverse fold of skin, its perpendicular diameter measuring 2½ cm., with an immediate success; but two months later the lids were inverted again. I removed another piece of skin of equal dimensions; and in the course of a few months the effect of the second operation also was reduced to a mere shadow. The enormous shortening of the skin had no permanent effect upon the lid border because the relaxed skin evidently was more easily moved by the shrinking scars than the edge of the lid.*

I admit the instance just related belonged to the bad cases of

* At the following clinique, Dr. Hotz exhibited a case of recurrent inversion of the lower lid to substantiate the above remarks. The patient, 60 years old, had granular conjunctivitis and a marked degree of entropion of both lower lids; the skin of his cheeks was very sallow, exceedingly flaccid and wrinkled. Five or six millimeters below the free edge of each lower lid there was a callous transverse scar running across the whole width of the lid. This scar was the result of an excision of skin for the cure of the entropion, performed five years ago. So lax was the skin that if a piece of skin, 2 cm. in vertical diameter, was taken up in a transverse fold, this shortening barely sufficed to evert the lid; while it was easily done without any sacrifice of integument by the operation described below.

entropion, and that in less difficult cases the same operation has often been performed with unquestionable success. But to me bad cases are always the most interesting because the most instructive. They are the only cases by which the merits of an operation can be fairly tested, because if there be any fault in the conception or execution of an operative method, they will bring it out in strong relief. If an operation cures mild degrees of inversion of the lower lid, but fails with more pronounced cases, I come to the conclusion that there is something wrong in the principle of that operation. And I believe it is not difficult to show that the frequent failures of the operations for entropion are undoubtedly due to the wrong or disadvantageous application of the principle of traction.

If one man wishes to pull another man towards himself, he tries above all to secure a firm foothold for himself to prevent his being drawn away and thereby to have the whole effort of his traction act upon his opponent. In this, as in every other instance where men wish to obtain the full effect of mechanical power, like traction, we observe the same plan is pursued in applying the power; it is always given a firm, immovable basis to issue from.

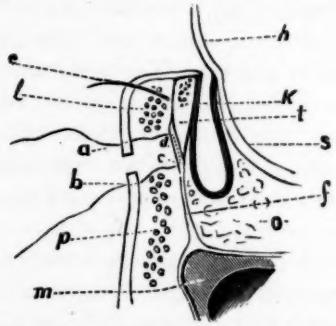
Now, as the whole result of the operation for inverted eyelids depends upon the proper action of the mechanical power of traction, is it not singular that surgeons did not adopt the best way of using mechanical power with the greatest advantage? Is it not strange that instead of securing a firm, anyielding basis for the lower end of the cicatrix, they committed the great blunder of affixing both ends of the contracting cicatrix to mobile structures? The natural and necessary consequence was that the traction worked both ways; its impulse was perceptible upon the integument of the cheek as well as upon the edge of the lid and the greater mobility of either alone determined which would be displaced the most.

This is a very unsatisfactory way of doing things. The effect of an operation upon so important an organ as the eye, should not be left to the influence of casual circumstances over which we have no control. If we employ the mechanical principle of traction for the cure of inversion of the lower lid, let us apply it

in such a way that we can determine its effect with an almost mathematical accuracy. *This is possible only if we obtain a fixed immovable point toward which the skin of the lid can be drawn and to which it can be so fastened that a permanent traction is made upon the free border of the lid.*

Such a point is the lower border of the tarsal cartilage.

To recall to your mind the necessary anatomical data, let me say that the lower lid is composed of the following layers: external integument; subcutaneous cellular tissue; orbicular muscle; another layer of cellular tissue; tarsal cartilage or tarsus; and conjunctiva. To the lower border of the tarsus (*t*) is attached a strong fascia (*f*), the fascia tarso-orbitalis, which, extending from the tarsal cartilage to the infra-orbital margin (*m*) of the maxil-



lary bone closes the lower part of the orbital cavity (*o*) against the pars orbitalis (*p*) of the orbicular muscle. At the osseous margin this fascia passes over into the periosteum; at the tarsus it is blended with its lower border and also spread upon the lower third of its anterior surface. Owing to this fascial connection, the lower border of the tarsus can firmly resist any power which tends to move it upward, because through the fascia this upward movement is impeded by the infra-orbital margin. For this reason the lower border of the tarsus itself is an immovable point best suited as a basis for the traction which is to stretch the skin of the

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The above diagram represents a vertical section of the lower lid and its surroundings; *k*, conjunctiva of lid; *t*, tarsal cartilage; *e*, eyelash; *l*, lid portion of the orbicular muscle; *p*, pars orbitalis of same muscle; *f*, fascia tarso-orbitalis; *c*, *d*, expansion of fascia upon lower third of tarsus; *m*, infra-orbital margin; *o*, orbital tissue; *s*, sclerotic; *h*, cornea; *a d c b*, course of the suture.

lower eyelid and to draw its free edge downward and outward in case of inversion.

This firm basis gained, a very slight traction suffices for the reposition of the inverted eyelid. I will demonstrate it on the patient before you. The lower border of the tarsus of the lower lid describes a slightly curved line with its convexity looking downwards; its place is indicated by a fine, slightly curved furrow more or less well marked in the skin, and from 4 to 6 m. m. below the edge of the lid. Now, I put this silver probe in the furrow and with the slightest possible pressure I push the skin directly downwards and backwards. The movement of the skin thus produced is scarcely perceptible, and yet it is sufficient to turn the lid border. It has now a normal position.

That you may fully realize the importance of this experiment, let me show you, by way of contrast, what a large piece of skin would have to be removed to obtain the same result. I must take up a transverse fold of as large a piece of integument as the open prongs of these forceps can grasp, in order to turn the inverted lid border. All this skin would have to be excised, were we to follow the common practice in the treatment of this case. But over one year ago I came to the conclusion that the excision of skin was an unnecessary mutilation; that our object could be accomplished with greater nicety and certainty without shortening the skin. I have since departed from the high road of common practice, and the larger my experience grew, the better I was pleased with the new method of operating for inversion of the lids. In the *Archives of Ophthalmology*, Vol. viii, No. 2, you will find a description of this operation for the entropion of the upper lid. And I shall presently show you how the same operation is performed upon the lower lid.

Four or six millimeters below the lid border (just along that fine furrow I referred to before), I make a transverse incision, which severs the skin of the lid from the integument of the cheek. An assistant then draws with a forceps the upper border of the wound upwards, while I am drawing the lower border downwards. Thus the wound is widely opened and the orbicular muscle fully exposed. A few horizontal strokes of the scalpel near the upper border of the wound open the muscular layer

and submuscular cellular tissue and expose the lower border of the tarsus to its whole extent. The tarsus is easily recognized by its yellowish color; but if you are in doubt, just feel with your finger to detect the firm edge which differs quite perceptibly from the soft elastic resistance of the fascia below.

The bundles of muscular fibers which covered the lower third of the tarsus, must now be removed so that the skin and tarsus can be brought in direct apposition. As a rule, I find, after the incision of the orbicularis, no muscular fibers upon the surface of the tarsus; but find them attached to, and drawn up with, the tarsal skin. With a pair of fine forceps I seize the muscular fibers near the upper border (*a*) of the skin and excise a strip, about 3 m. m. in width, along the whole length of the lid from canthus to canthus. This done, the wound is ready for the final and most important step of the operation, the application of the sutures. The curved needle armed with fine black silk * is thrust through the skin of the lid, a few m. m. from the border of the incision (at *a*); then it pierces the fascial expansion upon the lower third of the tarsus (at *d*) and is carried downward along the tarsus until its point emerges again (at *c*) from the fascia a little below the tarsal border; and finally it is passed through the lower border of the wound (at *b*), great care being taken to exclude all muscular fibers from the loop of the thread. The suture (*a*, *d*, *c*, *b*,) thus inserted, includes only the two cutaneous borders and a piece (*d c*) of the fascia, and when it is tied, it brings the cutaneous borders together and also draws them down to the tarsus.

Three sutures of this kind usually are sufficient for uniting the skin with the whole length of the tarsal border. During the first twenty-four hours after the operation the eye-lids are kept covered with cold water compresses; they relieve the smarting sensation and probably also mitigate the inflammatory reaction. On the second day the lids are found slightly swollen and tender; this swelling and tenderness are a little greater on the third day, but subside quickly after the removal of the stitches. As a rule the sutures are taken out on the third day.

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*I use black thread for the great advantage it has over light colored silk, in the easy removal of the sutures.

And now, while our patient is being etherized, I invite you to examine a few eye-lids upon which this operation has been performed sometime ago. In none of these cases has the skin been mutilated by excision or ligation; in every one the operation has been successful. And I wish to turn your attention particularly to the firm union which is established between the skin and the lower border of the tarsus at the line of the operation, marked out by this linear transverse scar. The firmness of this union and the important rôle that it plays, is manifested when you push the integument of the cheek upwards. You may do so as much as you please, and you notice this has no influence upon the position of the lid border. It does not turn in, no matter how much you relax the tissues of the cheek, which it would do very readily, if its eversion had been brought about by the contraction of a cutaneous cicatrix.

In the beginning of this lecture I mentioned, as the greatest defect of the old operations, that their result was too dependent upon the state of the integument of the cheek, and that in this dependence I recognize a fruitful source of the recurrence of entropion. This new method has made the result of the operation wholly independent of the condition of the surrounding tissues; and this independence is a sure guarantee that the pains of the surgeon are not expended for an ephemeral result, but that his labor will be rewarded by a permanent success.

The students of the Woman's Medical College and of the Rush Medical College had the pleasure of witnessing, on Monday evening, December 22, an exhibition of a beautiful series of micro-photographs prepared and kindly loaned by Dr. Walter Kempster, the efficient Superintendent of the Hospital for the Insane near Oshkosh, Wisconsin. These excellent pictures were prepared by Dr. Kempster to illustrate his article published in the proceedings of the International Medical Association in 1876. They demonstrate conclusively that the doctor's capacity extends beyond the duties of a medical superintendent, and place him in the front rank of American histologists.

Original Communications.

ARTICLE II.

SPONTANEOUS OSTEO-MYELITIS OF THE LONG BONES. BY N. SENN, M. D., of Milwaukee, Chairman of Committee on Surgery. Read before the Rock River Medical Society of Wisconsin, at its meetiing held in West Bend, Nov. 8, 1879, and published by request of the Society.

Since the appointment of your committee, no great innovations or improvements have been made in the department of medicine assigned to your committee, hence I ask your indulgence if in the selection of the subject for my report, I have disregarded the letter of our by-laws. I shall invite your attention to a consideration of "Spontaneous Osteo-myelitis of the Long Bones." While traumatic osteo-myelitis was carefully studied by our surgeons during the late war of the rebellion, the spontaneous variety has attracted but little attention, and is entirely ignored by most of our text-books. As this affection is quite prevalent in this section of country, and is at present but imperfectly understood by the majority of the profession, I trust a discussion of this topic on this occasion may prove to be interesting and profitable to us all.

Definition.—Spontaneous osteo-myelitis is an infectious inflammation of the marrow of bone. All inflammatory diseases of the bones involve, to a greater or less extent, the medullary tissue; practically the surgeon understands by this term an affection where the inflammatory process begins primarily in this substance by localization of the infectious poison.

Synonyms.—A great variety of terms have been applied to this disease at different times and by different authorities, as,

endostitis, medullitis, ostitis, ostitis acutissima, osteo-myelitis diffusa, diffuse suppuration of bone, periostitis rheumatica, (diffusa, acutissima,) osteo-phlebitis, typhus des os, typhus des membres, pseudo-rheumatic inflammation of joints and bones. These different terms have served to convey the ideas entertained by different authors in regard to the location, nature or ætiology of this affection. Although every bone in the body containing marrow may become the seat of osteo-myelitis, the following remarks will apply to the disease only as it occurs in the long bones.

History.—Although this affection must have had an existence almost as early as disease itself, we find no mention of it until 1705, when J. L. Petit described an affection of the bones which was identical with what we now understand by osteo-myelitis. Similar allusions have been made to it by Gooch, Pott, Cheselden, Hey and Abernethy, some of their descriptions being sufficiently accurate to enable us to recognize the character of the lesion. The traumatic form was studied with more care and assiduity than the spontaneous variety. In 1831, M. Renaud published a paper "On Inflammation of the Medullary Tissue of the Long Bones," in which he gives a report of five cases occurring after amputation, all having terminated fatally. Cruveilhier alludes to this affection when he says, "The phlebitis of the bones is one of the most frequent causes of visceral abscesses following wounds or surgical operations in which the bones are involved. Roux credits Nélaton with having devised the term osteo-myelitis in 1834, and having published a brief account of it in 1844. In 1849, Mr. Stanley, in his excellent work "On Diseases of the Bones," gave an accurate description of the spontaneous variety under the title "Suppuration in Bone." In 1855, Chessaignac applied the term osteo-myelitis for the first time to the spontaneous form, reporting four cases. Traumatic osteo-myelitis has always been of frequent occurrence in military practice and in infected and badly ventilated hospitals. Among the military surgeons who have advanced our knowledge of this form of the affection, Vallette, M. Roux, Jules Roux, Larrey, Pirogoff, Lidell and Allen deserve prominent mention. In 1865, W. Roser gave a complete resumé in thirty propositions, of what was then known concerning the spontaneous variety. While the

traumatic form was generally admitted to be of an infectious origin, the spontaneous type was considered purely inflammatory until Durcke ascertained its infectious character. Demme, Volkmann, Schede and Hueter have added valuable contributions to our knowledge of this disease by their pathological investigations and clinical observations. Rosenbach and Kocher, by numerous experiments on animals, have established many facts corroborating the theory advanced by Durcke. From the history of this disease, it will be seen that our knowledge pertaining to it is of comparatively recent date. Before pathological anatomy established the fact that the marrow is always the primary seat of inflammation, this affection was confounded with ostitis or periostitis. Before osteo-myelitis was recognized as a distinct affection, ostitis was regarded as a frequent disease of bone. At present osteo-myelitis must be considered the most frequent of all inflammatory diseases of bone, while ostitis is of very rare occurrence.

In opposition to the generally received opinion that the disease originates primarily in the medullary tissue, are the views of M. Gosselin and M. Guérin who attribute the suppuration in the marrow to an antecedent subperiosteal suppuration, occurring especially where the matter has not been evacuated by an early incision. They regard osteo-myelitis as a lesion secondary to inflammation of the substance of the bone proper, or its fibrous envelope, and seek to prevent it by free and early incisions, even to the extent of penetrating into the interior of the bone. M. Panas has found the myeloid tissue not only in the central canal of the long bones, but likewise in the deeper layer of the periosteum and the Haversian canals; it is therefore not necessary for the disease to originate in the central medullary canal, but it may, and very frequently does, commence at any point where myeloid cells are found. This view is substantiated by the clinical fact that this disease affects with greater frequency individuals during a time in their lives when the medullary tissues exist in greatest abundance, and by its manifesting a strong predilection for those portions of the bones containing the greater amount of marrow. From the peculiar relation of the structures it is easy to understand that inflammation of bone or periosteum will affect the

medullary substance by contiguity, but the surgeon applies the term osteo-myelitis exclusively to those cases where the marrow is the primary focus of the inflammatory process.

Structure and Function of Marrow.—Periosteum, osseous tissues proper, and medullary tissue are anatomically distinct, but in a physiological sense combined, being supplied by the same nerves and blood vessels. Any one or more of these substances may disappear during pathological changes, and may, by metamorphosis of their histological elements, be converted into each other. A similar metamorphosis of those tissues constitutes a well established fact in physiology. By sympathy and contiguity a pathological or physiological process in one structure is very apt to involve others to a greater or less extent. The appearance and structure of marrow varies according to age and locality in which it may be found. In the fœtus and in the cancellated structure of bone it is red and contains only a trace of fat, while in the central medullary cavity of the long bones in the adult, it presents a yellowish color, and is composed almost entirely of fat. The difference in color depends on the presence or absence of fat. The red or embryonic marrow contains about 86 per cent. of myeloid cells. These are round simple embryonal elements measuring from 0.0129 to 0.0257 m. m. and containing one or two nuclei and granular matter. Some of these cells assume a spindle-shaped form and are transformed into connective tissue cells, others are changed into fat cells, while the rest preserve their lymphoid character. An important physiological function has been lately assigned to these bodies by Neumann and Bizzozero, viz.: the production of red and white blood globules which enter the circulation by immigration, a process opposite to the one described by Cohnheim. Neumann and Eales have observed a pecularity of the capillaries in the medullary tissue, their caliber being four times greater than that of the arterial branches that immediately supply them. This dilatation of the capillaries diminishes the rapidity of the blood current and favors the accumulation of the white globules of the blood and may possibly undergo here a transition from white to red corpuscles. The process of hæmato-genesis in the medulla may therefore be intra-vascular and extra-vascular, in the former case depending on a

metamorphosis of the white corpuscles, in the latter instance on a transformation of myeloid cells into blood corpuscles. To explain the possibility of the red corpuscles entering the capillary vessels from without, Dr. H. C. Hand, of St. Paul, suggests that during the formation of lacunæ the vascular walls may suffer a slight loss of continuity, affording thus an ingress to these bodies. The blood-producing function of the myeloid tissue has also received attention in this country through the investigations of Dr. H. C. Hand, Prof. H. C. Wood and Prof. Wm. Pepper, and in the light of experiment, microscopical examination and clinical observation, must now be considered an established fact in physiology.

The yellow marrow found in the central canal of long bones is composed of 96 per cent. of fat. The fat vesicles are lodged in a nidus of delicate fibers of connective tissue, interlacing freely in every direction, and becoming more abundant towards the outer portions of the marrow. In a healthy bone there is no such thing as an endosteum; this had only an existence in the imagination of the older anatomists. Bundles of connective tissue fibers are arranged longitudinally with the bone, but no complete membrane is formed, and the medulla is in direct contact with the bone tissue.

The principal source of blood-supply is the nutrient artery, branches of which form a delicate network, with meshes of polygonal shape. Free anastomosis exists between the vessels in the central canal and the reticulated tissue.

The nerves are derived in greater part from the cerebro-spinal system, and enter the bone with the vessels, through the foramina nutritia and the Haversian canals.

The presence of lymphatics has been demonstrated by fine injections by Bichât, in the substance of bone, if not in the central medulla. During early fœtal life, marrow does not exist; it is formed by transformation of osseous into medullary tissue, so that during the development of bone, not only bone but medullary tissue is formed. The most important anatomical properties to be remembered in connection with our subject are: the softness, vascularity and exuberance of the cellular elements of the medulla, as well as the unyielding character of the walls

surrounding it, all important factors in the production of inflammation and infection.

Ætiology.—Infection is the essential cause of traumatic, as well as idiopathic osteo-myelitis, the difference consisting in the manner in which infection is produced. In the traumatic form the infecting element is brought in direct contact with the marrow through a wound after compound fracture, amputation or resection; in the spontaneous form the poison enters the circulation, and is carried with the blood to the medulla, where it becomes localized.

The influence in preventing traumatic osteo-myelitis in contaminated hospitals has been strikingly illustrated in the general hospital in Munich. Before Lister's treatment of wounds was adopted, almost every patient who was brought to the hospital with a compound fracture, or had submitted to an amputation or resection, became affected with this disease, and the majority of them died of pyæmia. Since the introduction of the antiseptic treatment, this dreadful scourge has been unknown in that institution. The spontaneous variety is met with in a large proportion of cases in individuals under 25 years of age, before ossification of the epiphyseal cartilage has taken place. The period of growth and development of bone constitutes the most important predisposing cause. Perhaps 90 per cent. of the whole number attacked are between five and fifteen years of age. I have seen at least three cases where the patients were more than thirty years of age.

CASE I. *Osteo-myelitis of femur, with secondary suppurative synovitis of knee-joint; pyæmia; death.*—Joseph S.. aged 38, a laborer by occupation, in previous good health, received a slight injury of the lower part of his right thigh by a fall during the month of September, 1872. The injury was soon forgotten, but in a few days the patient experienced severe pain in the lower part of the thigh, attended by febrile disturbances, followed by a diffuse swelling. Three weeks from the beginning of the attack, the knee-joint became swollen, and the general symptoms assumed a more serious aspect. I saw him about five weeks from the time the first symptoms had developed themselves, and found him very much emaciated and suffering from hectic fever. Several open-

ings existed over and above the knee-joint, discharging profusely their sanious pus; a probe could be passed readily into the joint and into the interior of the femur, coming everywhere in contact with denuded bone. Amputation of the thigh was advised as the only means to save the patient's life, but was not acceded to, and the patient died two weeks subsequently, with symptoms of pyæmia. Cough, rapid breathing, chills and a jaundiced hue of the conjunctiva and skin made their appearance a few days before the fatal termination.

In this case the morbid process commenced undoubtedly in the lower and interior part of the femur. After suppuration had taken place, pus infiltrated the spongy portion of the condyles, and invaded the knee-joint through a perforation in the articular cartilage of the joint, exciting there a suppurative synovitis.

An early incision, with perforation of the compact layer, affording an outlet for the pus, might have been the means of saving the patient's life and limb.

CASE II. *Osteo-myelitis of lower extremity of tibia; necrosis; operation; recovery.*—August Musach, aged 35, laborer, with a scrofulous hereditary taint, came under observation in the fall of 1872. When he was about 12 years of age he received an injury to the lower portion of the right tibia, acute inflammation followed, resulting in suppuration and spontaneous evacuation above the internal malleolus. The opening discharged pus for a long time, when it finally closed, leaving the bone enlarged but causing no further inconvience. About a year ago he injured the same place with the blunt edge of an ax. Soon after the accident the part became very painful and in a few days swollen; in about five weeks a physician opened an abscess over the minor and lower aspect of the tibia. The pain and fever subsided but a thin and extremely offensive pus continued to escape until I saw him. At that time several openings existed above the internal malleolus; the lower end of the tibia was enlarged to more than twice its normal size. A probe passed readily through one of the cloacæ and came in contact with loose, dead bone. The soft tissues were very much indurated. The patient appeared to be well nourished but very anæmic. He was etherized and the bone exposed by an incision. The cloaca was

enlarged with the trephine and chisel and a sequestrum of cancellated bone infiltrated with fœtid pus was removed. The involucrum was fully an inch in thickness and almost as dense as ivory. The abscess cavity was lined throughout with large, whitish-grey granulations; only a very thin shell of bone seemed to separate the abscess from the anklejoint. The patient made a slow but permanent recovery. In this case the disease during childhood affected the lower epiphyseal cartilage and the spongy tissue on both sides of it and its results undoubtedly furnished a predisposing element for the second attack.

CASE III. *Suppurative synovitis of knee-joint; osteo-myelitis of femur; death.*—John Schulz, aged 32, laborer, with a hereditary tubercular taint suffered during his childhood from a synovitis of the left knee-joint, which terminated in false anchylosis and partial dislocation of tibia without suppuration. While at work during the spring of 1878 he injured the affected knee by a fall. In a few days severe pain and swelling supervened, accompanied by fever. A number of weeks afterwards an abscess appeared on the inner side of the knee, which was opened by a physician. When I saw him, about eight months from the commencement of the disease, I found the patient very much emaciated, an opening on the inner side of the knee discharged freely a sanious pus and permitted the passage of a probe into the joint when denuded bone was distinctly felt. The joint was swollen, tender and extremely painful on the slightest attempt to move it. I proposed to make a free incision on both sides of the joint, and, with a sharp spoon scrape away the carious articular ends under antiseptic precautions. I failed, however, to obtain the consent of the patient and his friends, and lost track of the case until about four months afterward, when I was again called to see him. I then learned that the whole thigh became swollen and extremely painful about three weeks previous to my visit. Several openings existed over the inner and outer aspect of the thigh, through which a probe could be passed down to the femur, which was found denuded of periosteum. The patient was suffering from chills and presented a jaundiced appearance. The spleen was considerably enlarged and over the posterior and inferior part of the chest numerous râles could be heard. As internal metastatic

deposits had evidently taken place, only a palliative treatment was adopted. The patient succumbed rapidly to the general invasion and in a few days death terminated his sufferings. In this case osteo-myelitis occurred as a secondary affection following destructive suppurative synovitis. The disease in the joint had destroyed the articular cartilage, and, from imperfect drainage, the pus in the joint infiltrated the reticulated structure of the condyles of the femur, causing finally a diffuse and fatal osteo-myelitis. It is evident that the establishment of free drainage, combined perhaps with *évidement* under antiseptic precautions, might have prevented the extension of the disease to the femur.

Location and climate appear to exert an influence in the causation of this disease. According to Volkmann it is frequently met with in Berne, Marburg, and Halle, but seldom in Zürich and Berlin. From the great number of patients suffering from necrosis and from the number of recent cases that have come under my observation, I am inclined to believe that this disease is quite prevalent in our section of country, more particularly along the lake shore. The frequent and sudden changes in the temperature, incident to this region, are a fertile cause in the production of internal congestions.

"Mr. Savory reports a case in which the exposure of a limb to sudden extremes of heat and cold by plunging it into ice cold or very warm water, caused acute osteo-myelitis and McNamara, of Westminster Hospital, cites the case of a boy in perfect health who fell through the ice Dec. 20th and on Feb. 15th suffered amputation at the knee-joint in order to prevent further absorption by extension of evident septicæmia. Dissection of the limb showed that the cancellated tissue and medullary canal of the tibia were entirely destroyed and that the outer shell (compact tissue) of the bone was more healthy than any other part; the myelitis being evidently not due to extension of inflammation from the periosteum to the medulla through the Haversian canals, as might naturally be supposed."

I have seen a number of cases where the exciting cause could be clearly traced to a sudden chilling of the cutaneous surface.

CASE IV. *Osteo-myelitis of humerus; necrosis; operation; recovery.*—Henry R., aged 18, farmer, previously in perfect

health, was attacked early in the spring of 1865, with severe pain in the upper portion of his humerus, almost immediately after bathing in cold water. He had over-heated himself by a long and rapid walk before he went into the water. The fever and general disturbance were severe from the beginning. After three days a diffuse swelling took place, extending over the whole arm and part of the forearm. In about three weeks, after the most terrible suffering, an abscess formed and discharged itself near the insertion of the deltoid muscle. Several other openings formed subsequently, through which several small pieces of bone escaped. The movements of the shoulder-joint became impaired and the muscles in its neighborhood became atrophied. At the end of the operation, June, 1871, several cloacæ existed, through which a loose sequestrum could be distinctly felt with a probe. The involucrum was found exceedingly dense and measured over an inch in thickness. The sequestrum was rough on all sides and had evidently a central origin. The primary disease involved the interior of the bone, and had extended from or over the upper epiphyseal cartilage to the middle of the humerus. Judging from the impaired motion in the shoulder-joint, the previous synovitis must have been quite severe. In about four months the wound had entirely healed, and the usefulness of the arm had materially improved.

CASE V. *Osteo-myelitis of tibia and radius; recovery.*— Reinhold Stolz, aged 12 years, a healthy boy, after over-heating himself in a game of ball, rested himself by lying on the cold ground until he became thoroughly chilled. When he came home he complained of a severe pain in his left leg, and the next day he was unable to walk. On my visit at this time (Oct. 30, 1877), his pulse was 140, temperature, 40°. The lower part of the tibia was tender, but no swelling could be detected. The least attempt to move the limb caused intense pain. In a few days a diffuse phlegmonous swelling appeared and an incision gave exit to a considerable quantity of reddish brown fluid, in which free oil globules were found floating on the surface. The tibia was found denuded of periosteum over several inches of its extent. The pain continued after the incision, and the general symptoms assumed a more serious aspect. During the second

week of the disease the lower part of the radius on the right side became swollen and tender; suppuration did not take place; the pain and swelling yielded in a few weeks to the persistent local use of tincture of iodine.

After a few months the general symptoms improved, and when last seen, the patient was able to walk, but the lower end of the tibia was found to be the seat of extensive central necrosis.

Over-heating of the body diminishes its power to resist the deleterious influences of cold. The internal congestion resulting from a sudden abstraction of heat from the cutaneous surface produces a stasis in the capillaries of the medullary tissue which favors the localization of the infectious germs which may exist in the blood. The influence of temperature is further apparent from the fact that, according to Luecke and Schede, the disease seldom occurs during the summer months. My observations would tend to corroborate this assertion. Most of my patients contracted the disease during the months from October to May.

Among the general predisposing causes may be enumerated, the period of youth, the male sex, occupation, a damp and changeable climate, scrofula, syphilis, and the period of convalescence after acute infectious diseases. Crowded school-rooms, badly ventilated sleeping apartments, damp dwelling houses, and other unfavorable hygienic surroundings, are potent agencies to render the system susceptible to infection. Among the local causes may be mentioned fractures, contusions and concussions, but traumatism in every form can only be viewed in the light of exciting causes. No amount of local mechanical, physical or chemical irritation is sufficient to produce the disease independent of the essential cause—infection. Rosenbach has even gone so far as to assert that the infection is one *sui generis*, a specific infection, while Kocher and most of the modern pathologists regard the infection analogous in charater to that producing other forms of inflammation. Both of these observers have made numerous and ingenious experiments on animals to prove the infectious nature of this disease. Rosenbach found that contusions, fractures and crushing of bone, as well as destruction of

marrow by cauterization, artificially produced under antiseptic precautions, were insufficient to produce osteo-myelitis.

In eleven cases of cauterization of the central medulla with a galvano-caustic wire, under the antiseptic treatment; in eight no suppuration took place; in three, where the burning was severe, necrosis occurred; the general symptoms were not severe, and suppuration very slight. In three cases where the marrow was operated upon by electrolysis, the results were negative. Injections of mercury, amalgamate of sodium, caustic potassa and sulphuric acid, directly into the medullary cavity, caused instant death during the operation, from the entrance of the irritants into the veins, but osteo-myelitis failed to be produced in any of them. Injection of a mixture of equal parts of croton oil and fat, previously heated to 100° C., produced intense inflammation of the soft parts, destruction of medulla and complete necrosis of the shaft of the bone. Two drops of pyæmic fluid, injected into the interior of the tibia of a rabbit, caused death in three days. An examination of the bone showed that extensive osteo-myelitis and necrosis had taken place. Rancid butter injected into the medulla excited a severe phlegmonous osteo-myelitis which came near proving fatal. On killing the animal some time afterwards, the entire diaphysis was found necrosed and separated from both epiphyses. In three cases where pus from an osteo-myelitic patient was injected into the medulla, well-marked, typical osteo-myelitis followed. These experiments were made on dogs and rabbits.

From the results of these experiments, Rosenbach concludes that mechanical, physical or chemical irritants applied to the marrow, with the exclusion of infection, cause simply death of its substance and the subsequent removal or absorption of the dead tissues. Injections of infectious matter excite a diffuse, purulent, phlegmonous, septic inflammation, followed in some instances by general infection and death. Osteo-myelitis, traumatic and spontaneous, can only occur after infection has taken place, no matter how severe and extensive the local destruction may have been. In spontaneous cases the infectious material circulates in the blood, and localizes itself in the medulla, where it reproduces itself, causing septic inflammation. Localization of the poison in

many instances is determined by local causes in individuals laboring under general infection.

Luecke assumes that a stagnation in the capillaries of the marrow, from any cause, may arrest the infectious germs at the point of obstruction where they find a fertile soil for their reproduction. Intense infection may lead to a fatal termination without localization. In most cases the poison remains latent or innocuous in the system until some local cause or causes determine its localization.

Kocher, who does not believe in the specific nature of the infection, was unable to produce, artificially, osteo-myelitis in animals by injecting into the marrow pus obtained from patients suffering from this disease. He regards osteo-myelitis, not as a specific infectious disease in the same sense as typhus, scarlatina and diphtheria, but simply infectious in the same sense as every other acute inflammation.

His experiments on dogs, by applying directly to the marrow chemical or mechanical irritants, resulted in ostitis circumscripta hyperplastica; osteo-myelitis did not occur in a single instance, provided infection was prevented. Injections of septic fluids containing bacteria produced the disease promptly. Injections of pure pus, with micrococci, was followed by sclerosis of the bone. Injections of caustic ammonia, and feeding the animal afterwards with decomposed blood, mixed with Pasteur's solution, resulted in osteo-myelitis, with grave constitutional symptoms. He believes also that traumatic influences are insufficient to produce osteo-myelitis without the aid of local or general infection. In external wounds communicating with the marrow, the septic germs in the air are brought in direct contact with the marrow; where no such direct entrance is possible, the septic bacteria enter the circulation through the gastro-intestinal or broncho-pulmonary mucous membrane, and with the blood-current reach the medulla.

Schueller succeeded in producing osteo-myelitis in animals by subcutaneous injections of decomposed blood. Mikulicz has ascertained that the presence of living micro-organisms in the septic fluid is essential for the production of progressive sepsis after injection; only slight reaction took place if the germs were destroyed by the addition of glycerine. S. Hasse found that a

much smaller quantity of osteo-myelitic pus would produce a more intense effect on the same dog if it was allowed to undergo decomposition for six days. When the circulation of the blood in the marrow is impeded, or extravasation has taken place, the septic organisms circulating in the blood are readily arrested, and find there a fertile soil for their development and reproduction.

Klebs, Recklinghausen and Langhaus have found micro-organisms in osteo-myelitic patients, in the inflamed medulla, in the secondary deposits, the thrombi and fat emboli, in the fibrous exudations on serous membranes, and in the lymphatic vessels. In not rare instances, according to Billroth, diplo-cocci and strepto-cocci were also found. In some cases the micrococci were so numerous as to constitute the principal bulk of the products of inflammation, imparting to the fluid a reddish-brown, emulsion-like appearance. The following cases may be of interest in this connection:

CASE VI. *Osteo-myelitis of femur; suppurative synovitis of knee-joint; micrococci found in pus.*—Albert P., aged eight years, had been in his usual health until September 10, 1879. While at school, he was attacked almost suddenly with a severe pain in the lower part of the thigh, which was attended by several chills and fever. On the second day the pulse was 140, temperature 40°; tongue coated; total loss of appetite; great thirst. The pain was very severe. Great tenderness, but no swelling over the lower epiphyseal cartilage of right femur. He was very restless and soon became delirious. Salicylate of soda in large doses was administered and tr. iod. and ice applied over the lower part of thigh. On the fourth day the knee and lower part of thigh commenced to swell. On the tenth day deep fluctuation could be felt; the swelling appeared to terminate somewhat abruptly about the middle of the thigh, the surface pitted on pressure, and the superficial veins were enlarged. Chloroform was administered and a free incision was made on the outer aspect of the thigh between the quadriceps extensor femoris and biceps muscles; after dividing the skin and fascia, the handle of the scalpel was used to separate the muscles until the periosteum was reached. This membrane presented a dark brown almost black color; fluctuation was distinct underneath

it; it was incised freely, and about two ounces of a thick brownish red matter escaped. On introducing the finger the femur was found completely denuded of its periosteum from the lower epiphyseal line upwards to the extent of about six inches. The epiphyseal line was marked by a deep groove indicating beginning epiphyseolysis. The operation was performed under antiseptic precautions.

A microscopical examination of the matter removed, made immediately after the incision, showed the presence of red and white blood corpuscles, pus globules, fat globules and numerous living cocci. After the incision the pain and fever became less; both re-appeared with increased violence after swelling of knee took place. A large aspirator needle was introduced into the joint, and a small quantity of pus removed; on injecting a five per cent. solution of carbolic acid, it was found that the fluid escaped through the incision above, demonstrating the fact that the knee-joint was in direct communication with the primary seat of osteo-myelitis in the femur. Marked improvement followed this procedure. A splint was applied to support the parts and prevent if possible, a complete separation of the lower epiphysis. In this case the morbid process began near the cartilage of agglutination and became arrested at the middle of the femur above; below, the pus escaped at the partially separated epiphyseal junction, but subsequently infiltrated the epiphysis and reached the joint through a perforation of the articular cartilage. The most favorable result that can be hoped for in this case, will be extensive necrosis of the lower portion of the shaft of femur and partial or complete anchylosis of the knee-joint.

The femur is most frequently affected. Seventy-three per cent. of all of Demme's cases involved the femur. In this bone the disease manifests a special preference for the lower epiphysary region, while in the tibia the order of frequency, is reversed. The great frequency with which the extremities of the shaft of the long bones are affected, receives a plausible explanation from the activity of the physiological changes during the growth of bone, and perhaps to a lesser extent by the greater frequency of traumatism in these localities.

English claimed that the extremity of the shaft and epiphysis

toward which the nutrient artery is directed, is always primarily affected, on account of the greater blood pressure in that locality. Clinical experience has proved the contrary.

Volkmann has called attention to embolism as a cause of osteo-myelitis and necrosis.

Ritter reports a case of spontaneous fracture of clavicle following osteo-myelitis, which was caused by embolism of the principal vessel supplying the bone. The patient was a woman 34 years of age, who, four days after an abortion, suffered from a periosteal abscess over the middle of the clavicle, which was opened by incision and closed in four weeks. A painful spot remained over the seat of the abscess. At this point a spontaneous fracture took place after which the pain disappeared. Union with deformity took place in the usual length of time.

Azam reports a case where osteo-myelitis followed tumor albus of the knee in a patient 32 years of age.

Case III affords a similar illustration.

Billroth has seen several cases of osteo-myelitis follow acute articular rheumatism of the knee-joint.

Stanley has observed several cases of suppuration of bone near the articular ends with implication of the adjacent joint, caused by tubercular deposits in the cancellæ, as tubercular matter was found in the purulent discharges.

Symptomatology.—The symptoms attending osteo-myelitis always indicate a grave affection. They vary in intensity according to the location and extent of the disease and later in the disease they are modified by the complications that may arise. In severe cases a chill or succession of chills followed by high temperature initiates the disease. The febrile state sometimes obscures the local symptoms to such an extent as to lead the physician to suppose that the patient is suffering from an attack of typhoid fever. If we recollect that Lenator entertains the opinion that osteo-myelitis may occur during an attack of typhus fever, the difficulty in diagnosis must be very great in some instances as the latter would obscure the local manifestations. Goltdammer reported a case of acute osteo-myelitis of the tibia to the Medical Society of Berlin, where the general symptoms simulated typhoid fever to such an extent that the patient, after an illness of ten

days, was sent to the medical wards as a severe case of typhus fever.

The patient had a pulse of 110–120, temp., 40.41° C., tympanitis, furred tongue, enlargement of the spleen, bronchitis, rapid respiration and delirium. On close examination, a slight swelling was found over the lower part of the right tibia with tenderness on pressure which led to the diagnosis of acute osteo-myelitis. During the progress of the case, pleuritis, parotitis duplex and synovitis of the right shoulder-joint made their appearance. The patient died 8 days after admission, or 18 days from the beginning of the disease. A post mortem examination revealed the existence of acute osteo-myelitis of the tibia and pyæmia. Chassaignac believes that diarrhœa is present in almost all cases in the beginning, but it is a more constant symptom after septicæmia or pyæmia have made their appearance. Usually the first symptom is the pain. This is generally severe, deep-seated, constant, boring, tearing or throbbing and referred to the primary center of the disease, usually in the vicinity of an epiphysary cartilage. Patients old enough to describe their sensation, complain of a feeling as if the bone was being broken. The patient objects to moving or handling the limb on account of an aggravation of this distressing sensation. In some instances where the disease begins insidiously the patient may continue to walk for several days, but is lame on account of the pain, which is increased by the weight of the body making pressure upon the cartilage of agglutination. This aggravation of pain, by bringing the epiphysis and diaphysis in forcible contact, is an early, prominent and important symptom. Impairment or entire loss of function of the nearest joint and the entire limb is one of the first symptoms. Swelling seldom takes place before the third day, but tenderness is present from the beginning and is usually located at the junction of the diaphysis and the epiphysis, and, from the close proximity of this point to the joint, disease of the latter is generally suspected by the patient and not unfrequently also by the physicians. In chronic cases, swelling may not take place for weeks or months; when it does, it is due to an extension of the morbid process to the periosteum or the neighboring soft parts. After it has once made its appearance it increases with

great rapidity, including usually one joint and extending over a surface corresponding to the extent of bone involved. The swelling is œdematous and terminates abruptly at a point where the disease in the interior of the bone has become limited. Chassaignac was the first one to call attention to this peculiar clinical fact and place great stress upon its diagnostic significance. The superficial veins as a rule are enlarged and if the obstruction in the deep-seated veins from thrombosis or pressure becomes great, œdema of the entire limb may take place. In regard to fluctuations, Ed. V. Wahl says that it is circumscribed at first in phlegmonous inflammations of the soft parts, while it is diffuse from the beginning in osteo-myelitis. I regard this distinction as a good one.

From the anatomical location of the primary seat of the lesion it is easy to conceive that the products of inflammation are evacuated spontaneously only after extensive destruction of bone and soft tissues. On account of the resistance offered by the unyielding walls of the compact tissues many of the products of inflammation are forced into the circulation through the veins, producing in the first instance high temperature, and, later, fat embolism and pyæmia. Numerous experiments made with injections of chemical and medicinal substances directly into the marrow, have proven the possibility of thus forcing the substances directly into the veins. It is therefore logical to assume that affections of veins in cases of osteo-myelitis must be of frequent occurrence. In most of the fatal cases where post mortem examinations have been made, the veins were found affected, their interior being filled with thrombi in different pathological conditions. These necessarily lead to metastatic deposits in various internal organs. Fat embolism and pyæmia take place in a similar manner; both are attended with difficulty of respiration, cough and an aggravation of the general symptoms. In many severe cases the morbid process is not limited to a part or an entire bone, but appears simultaneously or in rapid succession in different bones of the body. Cases of this description have induced Roser to apply the term pseudo-rheumatism, and Simon used the term necrosial fever from their resemblance to acute articular rheumatism. Volkmann regards this form as a rare affection and applies to

it the term osteo-myelitis spontanea multiplex. A number of cases of this, the severest form of osteo-myelitis, have come under my observation.

CASE VII. Helen M., aged 18, not affected with any constitutional taint, was in good health until Nov. 12, 1872, when after a supposed exposure to cold she was taken suddenly ill with a chill, followed by high temperature (40.5°), and pain in the right knee and left shoulder-joint. The pulse varied between 120–140, and the fever was continuous; the morning and evening temperature ranging between 40°–40.5°. The general symptoms, and especially the low muttering delirium simulated typhoid fever, and almost obscured the local symptoms. Diarrhœa, slight cough, and rapid breathing were early and conspicuous symptoms. The pain in the localities mentioned, was at first severe but soon subsided after the appearance of a diffuse œdematous swelling. Well-marked tenderness existed over the upper epiphysary region of the tibia and humerus. New points of inflammation made their appearance during the progress of the case, at the middle of the clavicle on right side; lower end of femur, left side; third and fourth rib, left side; lower end of radius on right side. At the end of the first week deep fluctuations could be detected at most of these places, but the patient's general condition had assumed such a serious aspect that no incisions were made. Notwithstanding the early and persistent use of stimulants and tonics, the patient died on the 10th day of the disease, with symptoms indicating serious lung complications from metastatic deposits.

CASE VIII. *Multiple osteo-myelitis; pyœmia; death.*—Joseph E., aged 14 years, a healthy boy, was taken Dec. 31, 1878, with a severe pain in the middle of the right thigh, which rendered him at once unable to walk. The thigh did not become swollen for three days. Chilliness and fever were present from the beginning. When first seen the thigh was swollen and œdematous from the lower third upward, measuring two inches more than the opposite one; superficial veins enlarged; pulse 120; temperature 40°. The patient was very restless and delirious most of the time; great thirst and total loss of appetite. On the ninth day the lower part of the right fore-arm, on radial

side and wrist was found swollen, as well as the right parotid region, the latter occurrence rendering deglutition difficult. He remained in about the same condition, the pulse ranging from 116 to 130, and the temperature from 38.5° to 40° until the 21st when the left knee commenced to swell; December 30th, a swelling appeared over the left clavicle; January 15, 1879, fluctuation being present, an incision was made on the outer aspect of the thigh, lower part of radius and middle of clavicle, giving exit to a thin sanious fluid. The femur and radius were found extensively denuded and the clavicle had suffered spontaneous fracture about its middle. The abscess cavities were kept open by drainage tubes and were washed out daily with a 3 per cent. solution of carbolic acid. Toward the final termination the patient became sallow and suffered from a dry hacking cough, symptoms plainly indicating the presence of pyæmia. The patient died on the 27th of January, eight weeks from the beginning of the disease.

CASE IX. *Multiple osteo-myelitis; necrosis; recovery.*—John S., aged 14, with an hereditary strumous diathesis, was attacked suddenly during the month of November, 1872, with a severe pain in the upper part of the right thigh and the lower part of the left tibia almost simultaneously, attended by violent constitutional disturbance, fever and delirium. In a few days a rapid and diffuse swelling appeared in both localities, in the thigh it evidently involved the hip-joint. About two weeks afterward, the patient failing rapidly, chloroform was administered and an incision made on the right side, extending into the hip-joint, which gave exit to a large quantity of a thick brownish red fluid, mixed with laudable pus. The upper portion of the femur was denuded of periosteum and the hip joint affected with suppurative synovitis. The incision over the lower portion of the left tibia liberated a moderate amount of a thin sanious fluid, mixed with numerous fat globules. From the epiphysary junction upward, the tibia was separated from the periosteum for a space of more than five inches. The abscess cavities were washed out daily with carbolized water, and nutritious food was freely administered as well as tonics and stimulants. The pain diminished after the incisions, but the general condition did not improve for several months. Profuse suppuration continued for several months until the upper epiphysis

of the femur and a number of spiculæ of bone escaped spontaneously from the hip-joint as well as a sequestrum from the tibia when it almost ceased and the patient regained his former health. In about one year the wounds had closed completely. The left leg was perfect; the right showed nearly two inches of shortening, but a movable false joint with slight flexion of the thigh upon the pelvis.

In some cases the disease appears in another, perhaps distant bone in a sub-acute form several weeks after the first invasion, and fails to develop itself fully because the original infection appears, as it were, to have expended its force at the primary seat of localization. In such cases the process terminates with an increased production of bone instead of suppuration. To substantiate this assertion I will report the following cases:

CASE X. *Osteo-myelitis of femur; spontaneous fracture; hyperplastic osteo-myelitis of radius; recovery.*—August Schulz, aged 13, son of healthy parents, after an alleged fall, was taken with severe pain in the left thigh during the winter of 1874, which soon rendered walking impossible. I saw him two weeks afterwards, and found the whole thigh and knee enormously swollen and œdematous. The superficial veins were enlarged. Fluctuation was perceptible around the whole circumference of the thigh, and was well-marked on the outer aspect of the limb, at the junction of the lower with the middle third of the femur. The patient was emaciated and very anæmic. An incision was made between the biceps and quadriceps extensor femoris, about 5 ctm. above the knee-joint, which gave exit to a large quantity of a mixture of a thick, brownish-red emulsion, with pus. The lower end of the femur, from the epiphysary junction upwards, to the extent of 20 ctm., was found completely denuded of periosteum. Drainage tubes were inserted, and the cavity well washed out daily with carbolized water. About two weeks later I found, during one of my visits, that the femur had fractured spontaneously at a point near its middle. This occurrence added greatly to the perplexities in the management of the case, and increased my apprehensions in regard to the prospects of the future usefulness of the limb, and not less concerning the possibilities of saving the life of the patient. The limb was placed

as nearly as possible in its natural position, with the knee slightly flexed, and a fenestrated plaster of Paris splint applied from the toes to the hip-joint. Soon after this unfortunate complication had taken place, the patient complained of a pain in the lower part of the right radius, and in a few days a circumscribed hard swelling made its appearance in that locality. Tincture of iodine was freely applied, which soon arrested the further progress of the disease and subdued the pain. About three months after the application of the first plaster splint, the new bone had become sufficiently firm to retain the position of the limb. The swelling above the wrist gradually disappeared, and the patient began to improve in his general health, so that during the following summer he was able to go to school with the aid of one crutch, a fistulous opening at the point of incision discharging a moderate quantity of pus. Three years afterwards I removed by sequestrotomy a large, rough, central sequestrum 17.5 ctm. in length, after which a permanent recovery took place, with a good, moveable knee-joint. Notwithstanding a slight curvature of the femur, with the concavity inwards, it is about 1.8 ctm. longer than the opposite one.

Case V may also serve as an illustration in this connection.

Diagnosis.—Mr. Holmes has well said that the disease under consideration is more frequently recognized at post mortem examinations than at the bedside of the sick. I am well satisfied that it is often mistaken and treated for other affections, as periostitis, ostitis, inflammation of joints, rheumatism, typhoid fever and even phlegmonous inflammation of the soft parts. When we remember that periostitis, ostitis, synovitis and cellulitis are secondary lesions intimately associated in the clinical history of every case of osteo-myelitis, and furthermore, that the fever attending it assumes such close resemblance to typhoid fever, it is not surprising at all that many cases are not correctly interpreted during life. A careful consideration of every feature of the clinical picture presented by each case, can only enable us to arrive at correct conclusions. There is no single pathognomonic symptom that would infallibly lead us to a correct diagnosis. The presence of fat globules in the products of inflammation was regarded as diagnostic by Chassaignac and Roser. Although

this symptom is present in some of the cases, it is absent in a larger number, and it may also be present during the course of other suppurative processes, as I have repeatedly observed. Fat is almost always present in the purulent discharges from gangrenous inflammation of the cellular tissue. In a diagnostic point of view, the pus derived from the primary seat of the disease presents the following elements for examination: 1. Blood corpuscles, red and white, their number depending upon the acuteness of the attack. 2. Pus globules. 3. A thick, brown, emulsion-like fluid containing fat globules and micro-cocci.

One of the most important symptoms for differential diagnosis is the absence of swelling for the first few days regardless of the severity of other symptoms, also its rapid diffusion after it has once made its appearance. In periostitis and phlegmonous inflammation of the cellular tissue, swelling is one of the earliest symptoms. In osteo-myelitis the swelling is at first œdematous, extends symmetrically around the entire bone and terminates abruptly at a point where the morbid process in the interior of the bone has become arrested. Fluctuation in acute cases appears about the end of the first or during the second week. The superficial veins are usually enlarged. A consecutive affection of one or more joints in close proximity usually makes its appearance about from the end of the first to the fourth week. The time of its appearance as well as its character depends largely upon its causation. While joint affections are almost constant in osteo-myelitis, they are seldom associated with periostitis. Early incisions are of great diagnostic value; besides affording an opportunity of examining the condition of the bone, the subsequent history is of importance in arriving at a correct conclusion. If the pain and fever subside after the incision, we have to deal, in all probability, with a case of cellulitis or periostitis; if they are only diminished or continue unabated, it may be safely concluded that the disease is located in the interior of the bone. The frequency with which pyæmia occurs during the progress of this disease, must also be remembered in rendering a final diagnosis. A very interesting case was reported by M. Auger at a meeting of the Société de Chirurgie, on January 8, 1879, which well illustrates the obscurity of diagnosis in some

cases, as well as the liability of neighboring joints to become involved if the disease occurs in an adult. The patient, a man 54 years of age, after having been out hunting, felt on the following day a violent pain in the right leg. The pain was most severe in the calf of the leg, the ankle and along the course of anterior tibial nerve, and came on in paroxysms without any regular intermittence. For a month the tibia was not swollen, when in a few days a purulent discharge took place on the upper third of the bone. Soon after this time the knee began to swell and the medullary canal was found filled with pus. An incision was made into the knee-joint on both sides under antiseptic precautions, and free drainage established. In three months the patient died of pyæmia.

Prognosis.—The mortality attending osteo-myelitis appears to be greater in hospital than private practice. Demme lost 4 out of 17 cases; Luecke, 11 out of 24; Kocher, 9 out of 26; and Schede 3 out of 23 cases.

Uncomplicated cases do not prove fatal very often. Roser says a fatal issue may take place without localization, and attributes death in such cases to an acute dyscrasia. Acute fatal cases can usually be traced to pyæmia, the result of phlebothrombosis. The organs most frequently affected by metastatic deposits, are the lungs, and next in frequency, the kidneys; in the former causing pleuritis, pneumonia or abscesses; in the latter, diffuse nephritis and anasarca. Fat embolism of the lungs has already been referred to as a cause of death. Great enlargement of the spleen is one of the gravest prognostic symptoms. Where the marrow is severely and extensively affected leucæmia is sometimes produced as a consequence, and of course leads to a fatal termination.

Schede has found the proportion of the white to red corpuscles of the blood change from 1.100 to 1.200.

I have invariably observed early and marked anæmia in all of my cases.

The thermometer furnishes us with an important prognostic aid in this as well as in many other acute affections.

If the morning and evening temperature remain constantly

high, that is to say, range between 40°–40.5° during the first week, it indicates a severe case.

The more the general symptoms resemble typhoid, the graver the case. Chronic pyæmia is sometimes the cause of death. After incision secondary infection may take place, which may result in death by septic or pyo-septic infection. This result is more likely to follow in this than most other affections, as the cavities in the bone are reached and disinfected with the greatest difficulty.

In regard to the function of the limb after osteo-myelitis, a few words are necessary. Necrosis to a greater or less extent is the rule. Joint affections and partial or complete separation of epiphysis are frequent complications. If the effusion into the joint is passive from phlebothrombosis, or catarrhal, it is generally absorbed, and the function of the joint is restored completely. If the effusion is sero-purulent and the cartillage remains intact, aspiration and washing out the joint with a five per cent. solution of carbolic acid may be sufficient to restore the usefulness of the limb. Stiffness of the joint to a greater or less extent as well as mal-position of the articular ends of the bones, are events that cannot be avoided in all cases, even by the most skillful and attentive treatment. If the cartilage of the joint has become destroyed by suppurative synovitis, false or complete anchylosis and more or less deformity cannot be prevented. Separation of the epiphysis may be repaired completely, as will be seen from the following cases:

CASE XI. *Osteo-myelitis of both tibiæ; sero-purulent effusion in knee-joints; separation of epiphyses; recovery.*—Carl Schulz, aged 14, after exposure to cold was taken suddenly with severe pain in the upper part of both legs during the winter of 1874. No swelling could be discovered the first four days; after this time the upper part of both legs became rapidly swollen and œdematous. The patient was treated for rheumatism for four weeks. When I saw him, about this time, I found him very much emaciated and extremely pale; pulse very rapid; profuse perspiration, etc. A fistulous opening existed on both sides about three inches below the knee-joint, discharging freely this sanious pus. The legs were œdematous and the superficial veins

enlarged. The shaft of the tibia was completely separated from the epiphysis on both sides. A probe could be passed through the opening between the diaphysis and epiphysis. The shaft of the tibia was denuded of periosteum over a considerable extent. Both of the legs were flexed and the slightest attempt to move them was attended by great pain. Both knee-joints were swollen. The patient was placed under the influence of chloroform and the existence of epiphyseolisis verified by the existence of preternatural mobility and crepitus at the epiphyseal junction. To ascertain the character of the effusion into the joints, aspiration was performed and a sero-purulent fluid removed. Both joints were thoroughly washed out with a five per cent. solution of carbolic acid and a plaster of Paris dressing applied from the toes to the middle of the thighs, with fenestrated openings over the anterior aspect of the leg. The abscess cavities were washed out daily with carbolized water and the wounds covered with cotton saturated in carbolized oil. Tonics and stimulants were given freely to support the patient's strength.

With the knowledge I then had of this disease, I must freely confess that I should have been tempted to advise amputation had the disease been limited to one side. As it was, I had but little hope of saving the patient's life. Contrary to all expectation, however, slow but uninterrupted improvement began to take place. A slight effusion reappeared in a few days but was absorbed without further treatment after several weeks. A number of months subsequently, several rough pieces of bone escaped through the openings, after which suppuration ceased and the wounds closed. About a year after the beginning of the disease the patient was able to walk with the aid of a cane, the joints being somewhat stiff. At present the upper extremities of both tibiæ are enlarged, the mobility of the joints is completely restored, the patient is a strong, healthy young man, nothing in his gait indicating the extent of his previous disease.

CASE XII. *Osteo-myelitis of tibia; partial separation of lower epiphysis; operation; recovery.*—August Scholtke, aged 11 years, a previously healthy boy, was taken with a severe pain in his right leg, accompanied by grave constitutional symptoms during the month of January, 1879. In a number of weeks an

abscess opened spontaneously above the ankle-joint after which the pain diminished but the patient remained in bed in a feeble condition for several months. He was admitted to the Milwaukee Hospital, August 15, 1879. On admission the lower part of the tibia was very much enlarged from the ankle-joint to the juncture of the middle with the upper third. Three fistulous openings existed, as follows: over the middle of the shaft, above the internal malleolus, and above and internal to the external malleolus. With a probe a loose piece of bone was discovered, surrounded by a strong involucrum. After placing the patient under the influence of ether and applying Esmarch's bandage, an operation under antiseptic precautions was performed for the removal of the sequestrum. With a chisel the cloacæ were sufficiently enlarged to permit the extraction of the sequestrum, which measured 18 ctm. in length and was rough on all sides, indicating its central origin. A partial separation of the lower epiphysis was found; a probe could be passed freely in every direction between it and what remained of the shaft.

The granulations were scraped out with a sharp spoon and the cavity disinfected with an 8 per cent. solution of chloride of zinc and carbolized water. Lister's dressing was applied. No fever followed the operation and only a trace of suppuration. The process of repair was initiated at once and in a few weeks the wound had entirely healed. The new tibia is 1 ctm. longer than the opposite one, giving to the foot a slight varus appearance.

CASE XIII. *Osteo-myelitis of the tibia; separation of upper epiphysis; recovery.*—John M., aged 12 years, during the month of March, 1871, while engaged playing ball, was suddenly siezed with an intense pain in the head of the right tibia, which soon became so severe that he was unable to stand on the affected limb. Slight fever was present from the beginning, and a diffuse swelling appeared below the knee in a few days. In about three weeks an abscess was opened below the knee which gave exit to a considerable quantity of osteo-myelitic pus. Antiseptic injections were made daily and the wound covered with a gauze compress kept saturated with carbolized water. About two weeks after the incision was made, complete epiphyseolysis and swelling of the knee-joint took place, but as the fever had almost entirely

subsided, the effusion was supposed to be of a serous nature. A plaster of Paris bandage was applied from the toes to the groin with a fenestrum over the incision. Profuse suppuration for a while threatened to prostrate the patient but diminished after the removal of a rough, thick but short sequestrum. The effusion into the joint disappeared without special treatment and the patient regained his usual health and almost perfect use of the limb in a little over a year. Soon after the separation of the epiphysis the the patient was seen by an old surgeon, who advised amputation as the only means of saving his life; having, however, observed the wonderful restorative power of the *vis medicatrix naturæ* in similar cases, I insisted on pursuing a conservative course and was amply rewarded by obtaining such a satisfactory result.

From anatomico-pathological reasons the result is less fortunate if separation of the upper epiphysis of the femur or humerus takes place during an attack of osteo-myelitis. In these cases the head of the bone, deprived of its principal blood supply and surrounded by the products of inflammation, becomes necrosed and acts as a foreign body, exciting, not unfrequently, serious disorganization of the remaining joint structures, as was the case in the following instance:

CASE XIV. *Osteo-myelitis of femur; separation of upper epiphysis; operation; recovery.*—L. C., aged 10 years; the youngest member of a healthy family of children, fell from a haystack during the summer of 1870, and, as was thought at the time, sprained his hip. He was soon able to leave his bed, but walked quite lame; a few weeks later the knee on the same side began to pain him; the hip and upper part of the thigh became swollen and tender; violent constitutional symptoms followed, with hectic fever and rapid emaciation. In about three months an abscess formed in front of the upper part of the thigh, which soon opened spontaneously and discharged a large quantity of pus. The patient remained in a very feeble condition for several months, when gradual improvement commenced to take place, so that in the spring he was able to walk on crutches. About eighteen months later I performed excision of the hip-joint. The head of the bone was found loose in the joint; on

making a section through the bone below the great trachanter, the bone was found very soft and the cancellæ infiltrated with pus, the sawed ends presenting a greenish or gray color; consequently two more sections were made lower down until healthy bone was reached, removing in all the head and four inches of the shaft. The periosteum was thickened, and was carefully separated and preserved. The wound closed in a short time, but reopened on several occasions during the next two years, discharging several small spiculæ of bone, when it finally closed permanently, and the patient recovered with a very useful limb—motion in the false joint and two inches of shortening.

CASE XV. *Osteo-myelits of femur; separation of upper epiphysis; operation; recovery.*—George Muehlhauser, aged 15 years, of a strumous diathesis, has been in delicate health for a number of years. Without any obvious cause, he began to suffer from symptoms of acute coxitis in the fall of 1875. For several weeks he was treated on general principles, rest, extension, fixation, tr. iod., fomentations, etc., when the general symptoms became so grave that excision of the head of femur was considered the only chance to save the patient's life. On opening the joint, the head of the femur was found necrosed and completely detached, the upper portion of the femur was soft and infiltrated with pus. On a level with the trochanter minor the bone was porous, otherwise healthy. In about a year the patient recovered completely, the limb being about 4 ctm. shorter. In both of these cases the disease originated evidently in the cancellous tissue near the cartilage of agglutination and involved the joint secondarily. In the last case the upper and posterior portion of the acetabulum was denuded of cartilage, the affected tissues were scraped out with a sharp spoon. The prognosis in regard to the usefulness of a limb after an attack of osteo-myelitis depends less upon the extent of bone involved than the presence and severity of joint complications.

Pathology.—Simple non-infectious inflammation of the medulla is a physiological reparative process. According to Virchow, the medulla of infants resembles granulation tissue chemically and microscopically. The restorative function of myeloid tissue is studied most advantageously in cases of fracture and around osteo-

myelitic foci; in these instances its cells are transformed directly into bone cells, uniting the fragments in the former case and limiting the extension of the latter. In osteo-myelitis the inflammatory process extends beyond the process of repair, its tendency being in an opposite direction—to suppuration and necrosis. The inflammation is a specific one, and depends upon the presence of septic germs which are either brought in direct contact with the medulla or have gained entrance from without into the circulation through the respiratory or gastro-intestinal tract, and are conveyed with the blood to the marrow where localization takes place. Many causes which have been previously enumerated may determine localization, but the *sine quâ non* factor in calling into existence this destructive process, is the presence of living septic bacteria.

Morbid Anatomy.—Lidell describes three stages or morbid conditions in which the marrow may be found: 1. Carnification, 2. Suppuration, 3. Gangrene. In the first stage the substance of the marrow appears congested and has become abnormally firm. Fat globules are set free and are removed and the myeloid cells are generated with great rapidity. The sclerosis of the medulla is owing to a production of new connective tissue and partly to a hardening of the existing fibrous network. Only in exceptional cases is the disease arrested in this stage, but usually passes into the stage of suppuration. Acute œdema of the cellular tissue around the bone indicates that suppuration has taken place in its interior. Generally multiple deposits are disseminated over a greater or less area of marrow, but two or more of these purulent collections may coalesce and form large suppurating cavities. Pus globules are produced from leucocytes, connective tissue or myeloid cells, or all of them. In the cancellated tissue the cancellæ are either removed by pressure and absorption, forming abscess cavities, or a certain district loses its vitality and is separated from the surrounding living tissue as a sequestrum. The most intense form of infection may terminate in gangrene of the marrow. This form is extremely rare, and when it does occur, it is in traumatic cases, after amputations, in infected and over crowded hospitals. As a direct extension of the morbid process to adjacent tissues by continuity or contiguity of structure,

we have present in every case, ostitis, osteo-chondritis, periostitis and in most cases participation of neighboring joints.

The bone substance, from the intensity of the inflammatory process, or from arrest of circulation, undergoes necrosis, and if the life of the patient is preserved, is sooner or later detached from the living tissues. Instances have been reported where an entire bone, including both articular ends, has lost its vitality, constituting a large sequestrum. Usually only a part of the shaft, and in preference that near one of the ends of the diaphysis, becomes necrosed. In the lower part of the femur, necrosis takes place most frequently on the posterior aspect of the bone, and in the upper extremity of the humerus on the outer surface. If the vitality of the bone is not destroyed, its substance is softened by liquefaction and absorption of the inorganic matter, and from increased histogenesis of the marrow and bone cells which subsequently produce sclerosis. Osteo-chondritis may exist as a distinct affection, but more frequently it constitutes an important element in the history of osteo-myelitis. It may result in a partial or complete separation of the epiphysis from the diaphysis. I have no doubt that the disk of temporary cartilage placed between the shaft and epiphysis, serves a useful purpose in protecting the joint from the invasion of disease. The cartilage interrupts completely the continuity of the medullary tissue in the epiphysis and diaphysis, and to a less extent also the vascular connections. If the disease originates in the diaphysis, the cartilage must be destroyed to a greater or less extent before it can invade the epiphysis. Mr. Hutchinson, in his "Illustrations of Clinical Surgery," gives a beautiful illustration to support this view. The femur was amputated at its upper third. The patient died of pyæmia. The marrow and cancellated tissue of the bone were infiltrated with pus and presented a greenish color from the end of the bone to the cartilage of the great trochanter and head of bone. The bone above the cartilages was perfectly normal. I believe it is also a well-established fact that adults are more liable than children to suffer from destructive suppurative synovitis of joints, if the disease is located near the articular ends of the bones.

The softening of the cartilage usually commences at its mar-

gins. After complete or partial destruction of its substance, if the disease has not expended its force, the epiphysis is in danger of becoming infiltrated with the infectious products of inflammation, and the joint is placed in great jeopardy. Joint affections usually make their appearance from the 15th-19th day (Chassaignac), but may occur as early as the third day, or be delayed for months in chronic cases. The swelling of the joint appears slowly and insidiously, without any additional severe local or general symptoms. The joint becomes affected either by the establishment of a direct communication with the osteo-myelitic center through a perforation of the articular cartilage, or by an extension of the periosteal inflammation to the structures of the joint.

In some instances a chronic osteo-myelitis in an epiphysis leads to caseous degeneration of the products of inflammation (phthisis of bone) which may remain latent for a long time, but when it begins to break down and suppuration takes place, perforation into the joint is a frequent occurrence. If the joint communicates directly with the disease in epiphysis, the result is necessarily a suppurative synovitis with extensive disorganization of the articular and peri-articular tissues, and may produce infection of the opposite bone. Mr. Hutchinson, in his work quoted above, reports a very interesting case of this kind. A boy who had suffered a contusion of the hip, died of pyæmia two weeks after the injury. A post mortem examination revealed the existence of dirty pus in the hip-joint. The iliac bone and head of femur showed signs of recent inflammation. The affected portions of bone were discolored, being yellow in some parts, dusky purple or green in others. The discoloration in the head of femur was abruptly limited by the line of the epiphyseal cartilage.

If the joint inflames by contiguity, the process extending from the periosteum to the ligaments and synovial membrane, the product of inflammation is more likely to be serous, or sero-purulent, and the function of the joint is less apt to suffer permanent injury. Entrance of pus into a joint between the periosteum and bone must be a rare accident, as this membrane, with the ligaments is very firmly attached to the surface of the epiphysis. The periosteum participates, to a greater or less degree, in all cases. The periostitis must be purulent, fibrous, hæmorrhagic or osteo-

plastic, according to the character of the exudations. The disease extends to the periosteum from the primary seat through the Haversian canals or at the epiphysary junction. The irritation may not exceed the physiological limits and production of bone is the result. In severe and acute cases suppuration is always the result. The hæmorrhagic form is invariably fatal. If an incision is made before perforation of this membrane has taken place, its outer surface is recognized by its very dark brown, purple or almost black color. In typical cases the pus underneath it has a brown, bluish, emulsion-like aspect. After perforation of the periosteum, pus escapes into the parostral tissues and produces the well-known phlegmonous inflammation of the connective tissue. If the entire marrow has been destroyed and the periosteum completely separated, circulation in the bone is arrested and necrosis of the entire diaphysis is the inevitable result. After the acute symptoms have subsided, the reparative process is at once inaugurated. New bone is formed on the inner surface of the periosteum, which forms a case or involucrum around the dead bone until the latter is detached and removed as a sequestrum, either by spontaneous expulsion or through the interference of art. The cloacæ which lead to the dead bone indicate deficiencies in the periosteum, caused by spontaneous perforation, incision or destruction of the membrane. Osteo-sclerosis follows osteo-myelitis, but in exceptional cases the new bone remains porous and soft (osteo-porotic), a condition described by Volkmann and Schede, which may become the cause of various degrees of deformity from bending of the shaft. The veins of the marrow, bone and periosteum in inflammation of these structures are most always affected; the exceptions to this rule are few. Coagulation of the blood in the veins leads to phlebo-thrombosis. If the clot fails to undergo organization, it breaks down and small particles enter the circulation and are carried to distant organs where they are arrested as embola, causing metastatic deposits so characteristic of pyæmia. The same result may follow phlebitis and periphlebitis.

Dr. Woodward attributes the frequency with which pyæmia occurs in this disease to a septic infection which is propagated by continuity from the putrefied marrow to coagula in the veins.

Hutchinson believes that the particles of organic matter not only produce embolism and thrombosis but that they serve at the same time as carriers of living matter capable of infecting the tissues around the plugs.

Treatment.—The indications to be fulfilled in the treatment of a case of osteo-myelitis are:

1. To neutralize, if possible, the infectious element by local and general use of antiseptics. 2. To subdue inflammatory action. 3. To establish, under antiseptic precautions, an early and efficient outlet for the products of inflammation. 4. To prevent deformity. 5. To sustain the patient's strength by procuring the best hygienic surroundings and by the early administration of stimulants and tonics.

An early diagnosis is of paramount importance. An uncertainty in this regard often prevents the adoption of timely and positive measures to prevent or combat the progress of the disease. The deep-seated location of the malady offers the greatest obstacle to a correct diagnosis and successful treatment. Taking it for granted that in the spontaneous variety the septic germs enter the system through the gastro-intestinal tract it would be rational to assume that a brisk cathartic administered soon after the appearance of the first symptoms would be an efficient remedy to cut off any further supply of these noxious agents. In many instances nature makes an attempt in this direction by establishing a copious diarrhœa. A large dose of calomel administered for the same purpose and in the same manner as advised during the early stage of typhoid fever, could not fail to produce a beneficial effect. Salicylate of soda given in large doses from 6.0—24.0 grms. during 24 hours has been advised by Kocher with a view to neutralize the poison. In such doses this remedy would also promptly reduce the temperature, which is constantly high in all acute cases. If the medicine is rejected by the stomach it can be administered by enema. Opium must be given in sufficient doses to alleviate pain. The limb should be placed in an elevated position and the strong tr. iodine applied daily until vesication is produced. Demme, Billroth and Volkmann speak very highly in favor of iodine applications. If there is reason to believe that the first stage has not passed, ice should be applied over the part

affected for the purpose of diminishing congestion, provided such applications are agreeable to the patients. As soon as swelling takes place it is a sign that suppuration has taken place when warm fomentations should be substituted.

In regard to incisions, great diversity of opinion still prevails. Previous to the researches of Demme, early and free incisions were practiced. As the results in most cases were disastrous, he was led to adopt a more conservative treatment. He resorted to an expectant course of treatment until the poison had exhausted itself in the system, as indicated by reduction of temperature and cessation of local inflammation, and then made large incisions. For the purpose of affording an outlet to the products of inflammation, Klose made early and small incisions over the epiphysary junction.

Most all authorities agree that early and free incisions expose the patient to additional risks of septicæmia and pyæmia, while at the same time the primary seat of suppuration is not reached unless trephining is also performed.

M. Ollier is an advocate of early incision combined with trephining. In a communication read before the Academy of Sciences of Paris, he claims that trephining is applicable to all forms of osteo-myelitis with severe general symptoms. He says the most painful variety is usually found near the extremities of long bones. Trephining, even in the most diffuse form, will arrest the intense pain by reliving pressure; where the disease is circumscribed it affords prompt and decided relief. In the acute form, trephining will often prevent the grave and fatal symptoms, while in the sub-acute and chronic form it removes the most distressing symptom—pain. In eight out of nineteen cases of painful osteo-myelitis he found pus; and in ten cases the marrow presented different diverse morbid appearances, while in the last case, a case of acute osteo-myelitis of femur, a large quantity of fluid blood escaped. Two of the nineteen cases died of pyæmia. After pus has appeared beneath the periosteum or in the parosteal tissues, no time should be lost to remove it promptly. If it is permitted to accumulate, it may seriously compromise the integrity of neighboring tissues and organs and in addition serve as a source of infection. It can be removed safely with

the aspirator and the abscess cavity thoroughly washed out with carbolized water for the purpose of neutralizing the local infection, or by making one or more incisions under antiseptic cautels. Lister has found that no less than a five per cent. solution of carbolic acid is necessary to destroy bacteria or their products. Hueter has employed parenchymatous injections of carbolic acid with decided benefit in other inflammatory affections of bones and soft tissues. Kocher suggests injections of carbolized water into the tissues around the bone, made with a hypodermic syringe, several syringes full to be injected at different points twice daily. It seems to me the safest plan would be, after fluctuation can be detected, to remove the fluid with an aspirator, using a large needle and subsequently washing out the cavity with a five per cent. solution of carbolic acid. This simple procedure should be repeated as soon as the fluid reappears and until the acute local and general symptoms have subsided, when a permanent opening can be made without much risk of secondary infection. Kocher also suggests the propriety of making intra-osseous injections by penetrating the bone with a small perforator, and injecting carbolized water, thus reaching the primary focus of the disease. Theoretically the suggestion appears valuable, practically it would be uncertain and difficult of execution. Incisions, especially if practiced during the acute stage, should be made only under the antiseptic treatment. They should be made, if possible, at a point out of reach of any important vessels and nerves and over some well marked intermuscular septum. The limb should be shaved, cleaned and disinfected around its entire circumference and over a considerable space. To prevent hæmorrhage the knife should be used as little as possible; after dividing the skin and fascia the handle of scalpel and finger should be used to separate the muscles until the pus escapes, or if the periosteum remains intact it is incised with the knife. The opening should be sufficiently large to permit the introduction of the index finger for the purpose of ascertaining the condition of the bone. If necessary one or more counter openings must be made, with a view of securing free drainage. Large drainage tubes should be inserted, the cavity thoroughly washed out with a weak solution of chloride

of zinc or a five per cent. solution of carbolic acid and the antiseptic dressing applied.

No special benefit can accrue from making the incisions 12–30 ctm. in length as recommended and practiced by Demme. The antiseptic treatment of wounds justifies operative interference, which would heretofore have been considered unsafe and imprudent. It prevents decomposition of the products of inflammation and its result—septicæmia. Should putrefaction take place, then an attempt should be made to render the abscess cavity aseptic by applying thoroughly an eight per cent. solution of chloride of zinc, followed by a five per cent. solution of carbolic acid. Should an opening exist before the patient comes under treatment, free drainage must be established by enlarging the opening or making new incisions. Where the greater portion or the entire diaphysis of a bone has become necrosed and has become separated at one or both epiphysary junctions, it may become necessary to remove it during the acute stage to avert exhaustion of the patient from the profuse discharges and hectic irritation incident to such a condition. It has been argued against this operation, that the bone would not be sufficiently regenerated after its removal. This fear is however not supported by facts. Duplay, Holmes, McDougal, Lefort, Giraldes, Spence, Petregrin, Philzky, Wilms, Cheever, Ropes, and Gay, have each reported cases where almost complete reproduction followed the removal of the entire shaft. It is very important, especially in young persons, to preserve both epiphyses to prevent subsequent shortening and deformity of the limb.

I will report one case, where, after excision of two thirds of the shaft of the tibia, complete reproduction took place.

CASE XVI. *Osteo-myelitis of tibia; excision of two-thirds of the shaft; recovery.*—John Endlich, aged 12 years, of healthy parents, was the subject of osteo-myelitis of the right tibia which resulted, after four weeks, in separation of the upper epipysary junction; the knee-joint was considerably swollen at the time. The temperature was continuously high, delirium, rapid emaciation, etc. An incision was made three inches below the knee, after the second week, which gave exit to a large quantity of thin sanious pus on which floated numerous fat globules. Six weeks

from the commencement of the attack the constant fever and profuse suppuration threatened fatal exhaustion unless the source of irritation could be removed; it was consequently decided to perform excision of the shaft. After the patient was placed under the influence of chloroform an incision was made along the inner surface of the tibia, extending along the entire length of the diaphysis. The upper epiphysis was found detached, and the upper two-thirds of the shaft denuded of its periosteum; the bone was divided with a chain saw, about two inches above the ankle-joint. Immediately above the section the lines of demarcation between the dead and living bone could be distinctly seen. The medullary canal of the portion of bone removed was infiltrated with pus. The inner surface of the periosteum showed, at some points, deposits of new bone. The limb was placed at first upon a posterior splint, and afterward a fenestrated plaster of Paris splint was applied from the toes to the knee, and the wound dressed with carbolized oil. The fever and discharge disappeared almost entirely after the operation, and the general health began to improve. New bone began to fill up the large gap and in four months complete regeneration had taken place. The tibia is now somewhat larger and longer than the opposite one and the function of the leg is perfect. When both epiphyses have become separated from the diaphysis, the operation for removing the shaft is an easy one; all that is necessary is to make an incision sufficiently large to remove the sequestrum. Suitable mechanical support must be applied for a long time to prevent bending of the new bone. Should swelling of one or more joints arise, it is always well to make an exploratory puncture with a hypodermic syringe to ascertain the character of the effusion. If the effusion is serous no special treatment is necessary, unless the tension becomes great causing severe pain, when it can be removed by simple aspiration. If it is found sero-purulent, it should be removed with aspirator and the joint washed out with a 5 per cent. solution of carbolic acid, and the operation repeated as often as may become necessary. If the joint contains pus the same treatment is applicable, but if the effusion reappears in a short time then incisions and drainage, according to Lister's directions, offer the best prospects for recovery. This latter treatment is positively indicated if the joint

communicates directly with the disease in the bone, as in such a case perforation of the articular cartilage and serious destruction of other joint tissues has taken place. During the septic stage of acute osteo-myelitis with suppurative synovitis, amputation may become necessary to save the life of the patient. In exceptional cases the same sad alternative may be required after the acute symptoms have subsided for the purpose of removing the source of exhausting suppurative discharges. Our present means of treating abscesses and diseases of joints are fortunately sufficiently advanced so that even severe cases can be safely treated on a conservative plan, and amputation must be reserved only as a *dernier ressort* in extreme cases.

In chronic cases the articular extremities are usually the seat of disease, and as there is great danger that the joint may become involved directly by perforation of the cartilage, they should receive early attention and thorough treatment. If the bone is enlarged, softened, and no external opening exists, excellent results are obtained by ignipuncture, an operation introduced by Richet. The part affected, and considerable of the surface beyond, should be prepared in a similar manner as for incision; while the field for operation is covered with a spray, the round, sharp platina point of Paquelin's thermo-cautery, heated to a white heat, should be thrust into the interior of the bone at several points, and Lister's dressing applied. If an opening exists, an incision should be made, the cloaca enlarged, and the diseased and infected tissues in the interior of the bone thoroughly removed with a sharp spoon.

If the joint has become affected by suppurative synovitis, the choice can only be between resection and amputation. The special indications of each individual case must determine in favor of one or the other of these operations.

From the frequency with which the joints become affected during the progress of this disease, our attention should be directed early towards proper management of this complication. Deformity should be prevented by appropriate mechanical support by means of splints or plaster of Paris dressings. A retentive apparatus, combined with suspension, will not only prevent contractures, partial dislocations of joints, and bending of newly-

formed bone, but will add materially to the comfort of the patient.

Should signs of pyæmia arise, our main reliance must be placed on the administration of large doses of quinine and alcohol. Luecke has obtained the best results from the administration of large doses of alcohol. Instances have been reported where two bottles of cognac were given, with decided benefit, during twenty-four hours. The patient should be surrounded by the most favorable hygienic influences, as fresh air, equable temperature, light and an abundance of plain, nutritious food. As soon as the acute symptoms have subsided, iron, especially the tr. ferri chloridi, should be freely administered. Should any dyscrasia, as syphilis, scrofula, tuberculosis or scorbutus, exist, it should be corrected by appropriate medication.

CONCLUSIONS.

1. Spontaneous osteo-myelitis is an infectious disease.
2. It is most prevalent in damp, changeable climates, and during the winter and spring months.
3. It affects with preference individuals during the period of growth and development of bone.
4. Traumatism and other agencies, which produce a retardation or arrest of circulation in the vessels of the marrow, act only as determining causes.
5. Its primary seat is usually in the marrow of the cancellated tissue, in close proximity to the epiphysary cartilage.
6. Joint affections are frequent and prominent complications of this disease.
7. Thrombosis and inflammation of the veins of the marrow, bone, periosteum and soft parts are of frequent occurrence, and are the direct cause of pyæmia.
8. Swelling is absent for the first few days, and when it does occur, it becomes rapidly diffuse, and is attended by œdema and enlargement of the superficial veins.
9. Fluctuation is diffuse as soon as its existence can be ascertained.
10. A constant high temperature and typhoid symptoms indicate the gravest type of the disease.

11. Death may result from the intensity of the primary infection, but is usually produced by some complication.

12. Early removal of the products of inflammation, under strictest antiseptic precautions and local disinfection of the tissues, are of paramount importance for its successful treatment.

13. Epiphyseolysis may become completely repaired.

14. Excision of shaft may become necessary during the acute stage, to prevent exhaustion from profuse suppuration; this rule is not applicable if the humerus or femur is affected, on account of the impossibility of keeping the limb in position until regeneration of bone has taken place.

15. In most cases fixation of the limb is necessary for the purpose of procuring rest and to prevent deformity.

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ARTICLE III.

ON THE USE OF WATER IN THE TREATMENT OF DISEASES OF THE SKIN, by L. DUNCAN BULKLEY, A.M., M.D., Physician to the Skin Department, Demilt Dispensary, New York; Attending Physician for Skin and Venereal Diseases at the New York Hospital, Out-Patient Department, etc. Read before the American Medical Association, at Atlanta, Ga., May 7, 1879.

Water is by no means an indifferent agent as regards its influence upon the skin, either in health or disease; its right use is capable of much good, its abuse is equally capable of much evil. As it is an agent which is ever at hand, and one which instinct suggests the employment of, it is pretty certain to be used in most diseases of the skin by the laity as well as by the physician, and it is well therefore for the latter to have definite views in regard to its value when properly employed and its harm when wrongly applied.

The employment of water to the cutaneous surface may be considered in reference to its use in health as preventive of disease, and its use when the skin is the subject of disease; in the latter case it may be studied both in regard to its general use to the healthy parts and its employment upon parts affected.

In regard to the application of water in health there is little question in my mind that abundant bathing serves as a great preventive, both of cutaneous diseases and of systemic disorders, although Hebra not long ago gave quite the contrary impression in his article upon the use of baths. The skin whose dried excretions are frequently removed and whose circulation is quickened by reasonable bathing, undoubtedly is in a more healthy state and is better capable of performing its functions than one whose sluggish action is favored by neglect, and whose epidermal covering is allowed to adhere until rubbed off in a dry state by the clothing, even though Hebra does argue that skin diseases are no more common among those who may be truly said never to bathe the whole body, as is seen among some eastern peoples, than among bathers.

In health then, I regard the daily use of the cold or tepid sponge bath, followed by active friction, as one of the greatest safeguards against disease, both of the integument itself and of the system at large. In regard to warm baths, they have their function, and as a nervous sedative they may be of real service to certain persons, and when the daily tepid or cold ablution of the entire surface is not performed, they should be employed at stated intervals for the removal of effete matter from the skin; once a week, as is so commonly practiced, usually suffices. After a warm bath, a cold douche, as with a shower, or with a sponge in a pail of cold water, greatly enhances the power of the bath as a quickener of cutaneous circulation, and diminishes the danger of catching cold.

The subject of the use of the Turkish and Russian baths and their modifications in health, is too large an one to enter upon at the present time, and in a measure foreign to the subject of the paper. Suffice to say, they are continually abused in health, not only as relates to any sudden accidents which may and occasionally do result to those in peculiar conditions, but also as to their repeated use, which, like any powerful stimulant, may be and constantly is followed by a reaction whose ultimate effect may be very bad. They are not the panacea for all bodily ills, they are not the balm of life, securing immunity from disease, indeed, no small share of cases of diseases of the skin in private practice occur in those who have previously employed these steam or hot air baths to a greater or less degree. Their proper use in certain diseased conditions of the skin will be referred to later.

The use of water to the skin in its diseased state, may be considered under several heads, as follows:

1. Common water baths, including river and sea bathing.
2. Ablutions, bathings or soakings, with hot and cold water.
3. Cold and hot packing: water cure.
4. Vapor and hot air baths.
5. Medicated water baths.
6. Natural mineral springs.

1. The ordinary warm bath, as before mentioned, has for its function the removing of effete matter and softening the skin, and equalizing the circulation. It may thus have a favorable action in disease and may be used with advantage in chronic

scaly eczema, psoriasis, ichthyosis, also in lupus and in obstinate ulcerative syphilis. This warm bath has been long used by Hebra continuously in certain cases, that is the patient remaining in the water for weeks or even months, the temperature being maintained by steam or a current of hot water, the water being also changed more or less continuously. In these the patient eats and sleeps in the bath upon a proper mattrass, only leaving the bath to empty the bowels. These have been found to be of principal service in burns, pemphigus foliaceus, phagedæna, etc., as I have myself witnessed, and are of really great value. In some instances patients have remained in them for many months consecutively.

But ordinary warm water baths cannot always be advised with impunity in all diseases of the skin; acute eczema, or even more sub-acute, exuding forms of this disease will be found to be aggravated by the contact of simple water. Urticaria will also be rather irritated, as will indeed most of the inflammatory affections of the skin. It is well to remember when baths are given to a patient with a pruritic skin, to give a caution against too great friction afterwards, as this not infrequently more than balances any soothing effect of the bath, and the irritation afterwards may be very great.

In regard to river and lake bathing, the reaction and the exposure to the air will aggravate most skin diseases. Sea bathing is of service in psoriasis, and warm baths of sea water have been followed, in my experience, with very beneficial results in this disease; it is a remedy which I resort to a good deal during the summer months. But sea bathing is decidedly harmful in most cases of eczema, as I have repeatedly witnessed, although I have heard of a few instances where the disease was very chronic and the eruption very indolent, in which sea bathing was said to have cured the cases. But I am very cautious about allowing eczema patients either to bathe in the sea or to spend much time at the sea shore. The same is true of acne, and every autumn I see many, many cases where the sea influence has greatly aggravated the eruption, and many where the eruption has appeared for the first time while by the sea side; sea voyages generally act unfavorably in acne. Sea bathing sometimes is of much service

in chronic urticaria, but in most of the acute inflammatory affections of the skin its use is to be prohibited.

2. In regard to ablutions or washings and bathings or soakings with hot and cold water, much may be said. The general tendency is to bathe or wash a diseased part for the sake of cleanliness, and this will pretty certainly be done, whether the physician directs it or not, and often in a manner greatly injurious to the lesion. It is a most common practice to wash eczema, and especially do we often see the eczema of children washed diligently, often several times daily, the mothers saying that they find it "impossible to keep it clean." Now, in my opinion, an eczematous surface should be washed very seldom and that only by special direction from the physician. Nature seeks to make a protective covering with the exudate; this is continually removed by washing, the process is repeated and cure is most certainly retarded. If more time be now given for the formation of a more resisting epidermal covering, occasional washings, serving to remove superfluous exudation and thus to allow the astringent used to come into contact with the diseased surface, repair will take place more speedily. I have repeatedly witnessed eczema in children get well under the same treatment previously employed by the physician calling the consultation, when only the frequent washings were omitted.

The same is true of eczema in the adult; as an instance of the effect of water in causing and prolonging an eczema, we may mention the case of the eruption when it occurs on the hands of wash-women, or those whose occupation compels frequent wetting of the hands. It is next to impossible to cure some of these cases, as in bar-tenders, waiters in hotels, as well as wash-women without a cessation of the occupation, and just so impossible is it to cure certain cases of eczema while frequent washing is practiced voluntarily.

But washing is indicated at times, and some judgment is necessary to determine just when this should be practiced. In eczema of the scalp it is rarely best to wash the head more than once or twice a week, and here, even more than elsewhere, it is specially necessary to reapply the ointment or other dressing *immediately* after the cleansing, before the denuded surface has had time to

become again covered with the impenetrable coating which quickly forms.

Proper use of water is also of much service in certain patches of chronic eczema, when there is much thickening of the skin, with oft-times desperate itching. Such patches may be washed daily with advantage, and sometimes they will bear very great stimulation. Thus, taking the sapo-viridis and a bit of flannel and water, very sharp friction may be made for several minutes, after which the part is to be washed off clean with warm water and immediately covered with the appropriate dressing; the stimulation may even be carried so far as to use a brush, and I well remember a plasterer at Demilt Dispensary, who scrubbed the backs of the hands with a common floor scrubbing-brush and soft-soap and water until they bled. The result of this active treatment was to remove a greatly thickened eczema of many years standing, so effectually that, although he has continued his occupation and I have seen him repeatedly during the past four years with eczema on the sides of the hands and fingers, the backs of his hands, which were the seat of his severe attack and energetic treatment, have remained perfectly smooth and healthy.

Hot water is sometimes of the very greatest value in eczema. In eczema of the anus often nothing gives so much relief as holding a cloth dipped in water, as hot as can be borne, against the parts and repeating the application two or three times; the part being then covered with the dressing appropriate to the case; the same is of service in eczema of the vulva. In eczema of the scrotum I frequently direct that the part shall be suspended for a few moments in a cup of very hot water before other application is made. Simple pruritus of these parts is also often greatly relieved by these hot applications.

Chronic eczema of the palms of the hands, where the surface is hard, dry, fissured, often shiny, and the hands well nigh useless, will sometimes seem almost to melt away under the daily soaking of the palms on the surface of a basin of scalding hot water, followed by diachylon or other ointment. Eczema of the ends of the fingers and of the nails sometimes yields to this after all other measures have failed.

Onychia, both where there is and where there is not an appa-

rent eczematous element, is also very greatly benefited by these soakings in very hot water, accompanied and followed by other appropriate measures.

Indolent ulcers of the legs take on active changes and often cicatrize rapidly under the powerful stimulation of the alternate application of a cloth dipped in very hot water, followed instantly by one taken out of a vessel of very cold water.

Very striking results are often obtained from the use of hot water in some of the forms of acne. It is applied by means of a cloth, as a handkerchief, dipped in the hot water and held to the face until the heat of the cloth has passed off, when the performance is repeated two or three times for a period of not over three minutes to five altogether; a long soaking of the face in water which is not hot enough will aggravate the eruption, but the reaction following the brief application of very hot water, is often very remarkable. After multiple scarification of the pustules and papules of acne, prolonged bathing with tepid water is of service in encouraging the bleeding, which otherwise always tends to cease sooner than is desired.

In certain cases of chronic erythema, where the congestion resists other measures, the alternate application of cloths dipped in very hot and very cold water, serves to break up the capillary stasis. On the other hand, repeated washing of ulcerative surfaces will often be quite sufficient to prevent their healing; this is often seen in ulcerative syphilides, which will sometimes resist the proper internal medication as long as repeated washings are persisted in, and yields to it almost immediately when cotton batting is applied and left undisturbed. Varicose ulcers of the leg are not infrequently kept from healing by the too diligent cleansing which patients are ever ready to bestow.

3. Cold and hot packing in wet sheets, as practiced in the water cures, is of a certain value as a remedy in diseases of the skin. The results which sometimes occur, as boils on the surface, are to be deprecated, and are not, as is popularly supposed, either a good sign, or a good element in the treatment; we of course no longer believe that there is a "materies peccans" which needs to be eliminated. But the wet pack has served well in the hands of Hebra in the treatment of acute psoriasis, also in

acute general eczema. The packing is made twice daily, for for several hours, morning and evening.

This is most conveniently accomplished by placing two blankets lengthwise upon a bed, and over them a sheet dipped in cold water. The patient then lies naked upon this, which is closely folded over him up to the chin, and the blankets are then wrapped closely around, and the whole done up with bands, so that the patient is immovably fixed, helpless indeed. The first sensation is that of a pleasant glow, and before long perspiration ensues, which should be encouraged by draughts of water frequently given; the packing lasts from two to five hours. It should never be forgotten to place an urinal between the thighs of the patient before envelopment.

Under this treatment the scales of psoriasis disappear, and the red patches daily become less visible. Few patients in this country will submit to this treatment, but when it is desired to remove the existing eruption in the shortest possible time, it is of value. Packing is not of service in many affections of the skin, and should seldom be prescribed; although in the water-cure establishments all eruptions are submitted to this course. The profession need more accurate scientific information in regard to the precise effects and the therapeutic indications of this powerful remedy.

4. Vapor and hot air baths, and their modifications, may play a not inconsiderable part in the treatment of certain cutaneous diseases, although from their expense and the difficulty of their application at home, and from the fact that most of the establishments where they are administered are in the hands of ignorant, unprofessional persons, they are not employed to the extent which their real value would indicate.

While there are undoubtedly differences in the mode of action and in the results obtained from the Russian or vapor and the Turkish or hot air baths, I am not aware that any distinctive therapeutical indications between them, or effects from one more than the other have been scientifically noted in diseases of the skin. The Turkish or hot air bath, with the subsequent cold douche, is that generally preferred and undoubtedly is the safer. It is of a certain value in psoriasis, and of some service in chronic

eczema, also in chronic urticaria, lichen and ichthyosis, but the results obtained are generally rather disappointing, and I must acknowledge that I use them comparatively seldom.

Certain modifications of the steam or vapor bath are, however, oftimes of considerable aid in treating diseases of the skin. Under this head come the sulphur vapor and mercurial vapor baths, which, as is well known, have great repute in this line of practice. They consist in a steam bath to all the body, save the head, combined with sulphur or mercury volatilized by heat. The value of the mercurial bath, in many cases of syphilis, need not be dwelt upon; its use should be strictly confined to cases where this diagnosis is certain. The indiscriminate use of a mercurial or sulphur vapor bath when the skin is affected is highly reprehensible.

The real utility of sulphur vapor baths in diseases of the skin is in a measure still *sub judice*. Their anti-parasitic value is fairly positive. If well used they will cure scabies, phtheiriasis and the vegetable parasitic diseases. But even in these the irritation occasioned by them is sometimes so great that the artificial eruption produced quite masks that of the disease proper and prevents their continuance. Sulphur vapor baths are also of some value in psoriasis, and occasionally the eruption will seem to yield to them, but quite as often they are powerless, as I have frequently witnessed. Chronic, more or less generalized papular eczema, may be much benefited by sulphur vapor baths, given every other day or so; but here care must be exercised, for this very condition may be entirely caused by their use.

Mr. J. L. Milton, of London, has arranged a convenient apparatus by means of which vapor baths, with or without the addition of sulphur or mercury vapor, may be administered at the patient's house with comparatively little expense. It consists of a series of hoops over which a thin rubber or gutta percha covering is stretched, which, when the patient is seated on a chair is gathered around the neck and reaches to the ground; a second cloak of coarse flannel is placed within the rubber and over the hoops. The patient sitting naked on the chair, with the Mackintosh closely drawn around the neck, a lamp with a steam generator is placed on the floor beneath the chair; after the body has been submitted

to the steam for some minutes, if it is so desired, the sulphur or mercury is introduced on a receptacle over the lamp, placed in the centre of the pan of boiling water, and continued for a few minutes longer. By means of this apparatus steam baths may be given with advantage in a number of cutaneous affections; acne, chronic eczema, lichen, psoriasis, etc., and when it is desired, a cold dash afterward makes of it a very decent substitute for the ordinary Turkish or Russian bath, according as steam is used or simply hot air; this can, moreover, be employed in localities where these are not accessible, or in cases where it is not desirable to have the patient leave the house. I have also had used a wooden box, constructed at home, somewhat like those employed at the establishments, in which the patient sits with the heat, which may be given by an ordinary low gas stove, beneath the chair. This can be made by any carpenter and is very inexpensive.

Mention must be made here of the vapor bath or douche applied locally in acne, as recommended so largely by French writers. It consists in holding the face over a basin of standing water, with the head and basin enveloped in a blanket or other covering. This plan answers very well in many cases, and greatly relieves the congestion, but the indications for it are better fulfilled, I think, in the method of soaking the face with hot water as previously described.

5. Medicated water baths. This is a very important division of our subject, and should always be considered in dealing with diseases of the skin. Not only is this an important matter in reference to the direct action of the bath upon the *diseased* skin, but the general medicated bath is to be considered in regard to its effect upon the general health, which may be very considerably modified thereby. Experimental investigations have shown very conclusively that under the frequent use of water to the whole surface, assimilation and disintegration proceed more rapidly than without it. In certain skin diseases, therefore, where these processes are slowly or imperfectly performed, the warm bath, especially when holding alkalies in solution, does much to improve the general health and to remove diseases of the skin, even from locations which are not submitted to the bath. Thus I have found many cases of acne to make much greater and more rapid improve-

ment when alkaline baths were added to the measures previously employed; the same is true of some cases of eczema of the face or scalp.

Many ways of medicating the water to be employed in the bath have been suggested which need not be mentioned here, inasmuch as practically but few are employed in daily practice, and the indications for the use of the various kinds of baths have never been laid down with any clearness or precision; and I regret that time forbids my entering more deeply into the subject at this time.

My most common medication for baths consists of carbonate of potassa, carbonate of soda, and powdered borax, four, two and one, ounces of each, respectively, together with from one-quarter to one-half pound of starch to a bath of thirty gallons. This is a mild alkaline bath, is decidedly soothing to most skins, and acts very favorably on sub-acute eczema and urticaria; it may be used much stronger, as in psoriasis, ichthyosis, prurigo, etc. The bath is to be given at bed time, at a temperature of from 87° to 95° Fahrenheit, the patient remaining in the water fifteen or twenty minutes. On coming out, if the skin is pruritic it is not to be rubbed, but dried with a heated sheet, and all diseased surfaces are to be covered at once with a suitable ointment. I find it very grateful to the patient to have the entire surface lightly annointed with the glycerite of starch, or cosmoline, to which a small quantity of carbolic acid, five to ten grains to the ounce, may be added, if there is much general itching.

Such medication of the bath may be modified to suit certain circumstances; thus, the starch may sometimes be replaced by gelatin, a half a pound to the bath, well boiled; or glycerine, four to ten ounces to the bath, will make it more soothing to some skins. Sometimes the soda and potash prove too drying, and the quantity of borax may be increased and these diminished.

It is difficult to give in a few words the exact indications for the use of these alkaline and starch baths, but in general I may repeat that they are soothing to a pruritic skin and serve admirably to promote the processes of life. Sub-acute and chronic eczema are almost always greatly benefited by such a bath, taken at bed time, twice or three times a week, or even every night, if not too debilitating.

Sulphuret of potassium has been frequently used in baths, especially to relieve itching, but I do not employ it except as used in the artificial Barèges baths, which may be obtained at some of the bathing establishments; baths made with sulphuret of potassium should be given in a wooden tub, as the salt rapidly attacks metal lined tubs, if in a strong solution. I have seen a number of instances of cutaneous eruptions where sulphuret of potassium baths had been used to the great aggravation of the disease, and cannot give any indications for the employment of this kind of bath, although the books mention it as valuable.

Occasionally benefit will be derived from the use of other substances in solution in baths. Thus, Hebra makes very considerable use of a bi-chloride of mercury bath, in syphilis, lupus and prurigo; nitric acid, or nitro-muriatic acid baths have been used with advantage in jaundice, and also in other diseases, especially to relieve itching, and to promote cutaneous action. Sometimes vegetable substances may be added to a bath, in certain diseases of the skin, as conium, opium, etc., for a sedative effect and the relief of pain; or astringents, as oak bark or tannin, for their particular effects.

The common warm, or an alkaline bath is sometimes given with much effect after the application of tar; thus, in chronic and much thickened eczema, the part is tarred over, and the patient enters a bath, remaining there 15 or 20 minutes; this is a favorite plan with Hebra.

6. Finally, the natural mineral springs should never be forgotten in the treatment of the obstinate cutaneous affections, although their efficacy is, in my opinion, greatly over-rated. The subject is too large an one to enter upon on the present occasion and will be deferred to another opportunity. Suffice it to say here, that while mineral springs are of much real service in many diseases of the skin, their use is not to he rashly advised without a definite knowledge of what is to be accomplished; they are to be prescribed, as any other remedy, to fulfill definite indications; certain springs, while beneficial to certain eruptions, are just as surely harmless or inefficatious in others. The habit, therefore, of sending a patient to particular mineral springs simply because affected with a disease of the cutaneous surface, is as irrational

as it would be to send one indifferently to Florida, Colorado, Minnesota or the Adirondacks, because some organ within the chest happened to be diseased, without any idea of the nature of the malady or the object to be effected by the particular climate in question; or one could quite as reasonably send one to a drug-shop because sick, without giving a prescription for the remedy required.

There is certainly great need of more definite and reliable scientific information, based on recorded facts, in reference to the vast resources of our wide country in the matter of natural mineral waters, and I cannot forbear the hope that a hydrological committee may be formed in this Association for such investigation. A not inconsiderable amount of information on the subject has come to my knowledge within the past ten years and I shall hope on another occasion to collect it from my notes of cases and to present it before you. I can premise in regard to it, however, that much of it is of a negative character, for I see multitudes of patients who have received but slight or temporary improvement or have failed entirely of benefit from a wrong use of mineral waters in diseases of the skin.

ARTICLE IV.

DENTAL HINTS FOR COUNTRY MEDICAL PRACTITIONERS. By G. NEWKIRK, M.D., Wenona, Ill.

PART II.

Examinations of Teeth.—The first thing to attend to is the securing of good light. In examining the upper jaw, the rest should be so adjusted that the patient's head shall be thrown well back, the occiput on a line with or below the chin. For the lower jaw, the head should be about perpendicular with the body.

In the greater number of cases, the patient will point out correctly the location of the offending tooth, but not always. It is not safe to take his mere say-so as conclusive. There is no place in the body where reflex action is more apt to deceive than in connection with the nervous system of the teeth. A perfectly

sound tooth may be pointed out as the offender, while the real source of trouble may exist at a point entirely unsuspected. Not long since a regular physician sent his son to me for the extraction of an upper molar that was almost perfectly sound. However, a second molar of the lower jaw, on the opposite side, had a large cavity, with a nearly exposed and tender pulp. Since an operation of capping and filling here, the boy has had no further annoyance in the region of the upper molar, nor with any of his teeth.

A tooth sensitive from a congested pulp, or the mere exposure of its dentine, will almost invariably respond to one or any of the following tests: A steel instrument touching or striking it; cold air or water ejected from the point of a syringe directly upon it; the introduction of a cold instrument into the cavity of decay, or pressure made in the direction of the pulp. These tests should always be applied with such care and gentleness as not to cause unnecessary pain.

With reference to the advisability of extractions the following points should be borne in mind. It is not always a sufficient apology for extraction of an aching or sensitive tooth that it belongs to the temporary set. As a rule, the temporary teeth ought to be preserved, if necessary by some sort of plastic filling, until near the time for the eruption of the permanent. They ought seldom to be removed until the root or roots have been in great part absorbed by the encroaching crowns of their successors to be. The country physician may often be of service to his little patients by using some sort of temporary protection for the temporary molars, in children from four to seven or eight years old, and sending them to a dentist for fillings sufficient to keep them useful and in place till the time proper for their removal.

Almost never should the physician extract a permanent incisor or canine for any young person; but if the troublesome tooth be a bicuspid, and the arch crowded so there seems to be not sufficient room for all the teeth, it may be for the permanent good of the others to have it removed. The same may be said of the first or sixth year molars, and more. If these teeth show indications of decay on all sides, appearing as they often times do to partake more of the nature of temporary than true permanent

teeth, it is usually a safe course to remove them whenever they give trouble, and all the better if before the twelfth year, so that the second molars may erupt further forward and assist in closing the gap. If the removal becomes necessary, as it sometimes does, previous to the eruption of the second bicuspid, the space will be well filled, usually, by the time both this and the second molar have reached the line of articulation.

The preservation of a wisdom-tooth in the lower jaw is sometimes a matter of importance where a plate is to be worn above. A badly-decayed wisdom-tooth above is seldom fit for anything but extraction, and especially is this true where the first molar has been kept. But the middle molar should be seldom drawn by any one where there seems a possible chance of saving it, and the responsibility should be passed over to the dentist. If instead of crowded teeth there has been already the loss of some, the value of those remaining is, of course, proportionally increased, and our responsibility the greater in removing any of them. In such a case, we may observe whether the tooth in question has an antagonist in the opposite jaw; if not, and it is an upper tooth, it will probably never be of practical use for purposes of mastication. Natural teeth above are almost never used for articulation with artificial ones below, but lower teeth thus standing alone may become very valuable for use with artificial upper dentures, and should on no account be extracted where it is possible to avoid that alternative.

If the patient is wearing a plate and partial set of teeth, which he expects soon to have made over, or if he has lost so many of his teeth that the early wearing of a plate is inevitable, these may be so many arguments in favor of drawing a bad tooth upon the same jaw, and the physician, as well as the dentist, may the more readily yield under such circumstances, when solicited to extract.

Sometimes a patient applies to the physician with a troublesome root, and either a fully-developed or threatened alveolar abscess. If it be the root of a back tooth, the rule should be extraction, but not otherwise. A front root, however unpromising it may be in appearance, may be the basis for the insertion of a serviceable pivot tooth, or the fastening of an artificial crown. Present relief may be nearly always given by simply drilling through the

pulp canal to the apex of the root, so giving vent to pus or confined gases, and the case may then be sent to the dentist.

The actual development of alveolar abscess, pointing from the root of any tooth, is quite certain evidence of the death of the pulp, in whole or in part, of that tooth. Almost invariably there has been death and decomposition of pulp and nerve substance, and the resulting fluid and gaseous matter has failed to find vent through the crown of the tooth, so seeks it by the ulcerative method through the process and gum. These conditions, when present, are usually the indirect result of caries. The actual or near exposure of the pulp, the sudden changes of temperature to which it has been subjected by cold air and hot and cold fluids have induced irritation, congestion, strangulation in the minute canals through which the blood supply must come, and death. They sometimes occur, however, independently of caries, not infrequently with elderly people whose teeth have been so worn down as to subject them, practically to the same vicissitudes. In all cases of this sort, instead of resorting to extraction, a free opening should be made into the pulp cavity, for present relief and further care of the tooth transferred to the dentist.

Whenever called on to look at any tooth, the opportunity should be improved for examining into the condition of the whole set and the necessary attention any may demand earnestly impressed on the mind of the patient. This may apply to filling, separating, regulating or cleaning. The country physician should also, like the dentist, ever impress upon his patients the duty of personal care and cleanliness with regard to the teeth. It may be here remarked, the important time for using the brush is just before retiring for the night, for the germs of decay are most often planted during the period of repose.

A "bad taste" in the mouth in the morning is more usually an indication of unhealthy changes that have taken place during the night, as a consequence of *uncleanliness*, than of "liver complaint" or indigestion, though this latter is often an associate.

He may very properly advise a change of diet for the benefit of children and young persons with teeth of poor structure. If wheaten grits, the so-called "Graham," corn and oat meal were

more generally used by them the quality of their teeth would be much improved in consequence.

Let us consider next the mode of procedure necessary to the proper examination and *treatment* of a tooth.

You have your patient in a good light and proper position as hereinbefore mentioned, and we will suppose the tooth to be operated on is the right, lower, second molar. I take this for illustration because it is one often requiring attention, and is of great importance; furthermore, the saliva is here most apt to be troublesome, and, if we can succeed against it, we will hardly fail to do so elsewhere.

We will suppose the decay has begun from the face of the tooth. The size of the hole through the enamel is no sure index to the extent of decay. But there will be the opening more or less wide, bordered by the broken and irregular edge of enamel. Beyond this edge, for some distance probably, careful examination will reveal the extension of the color line, showing where decay has burrowed into the underlying dentine. You take your chisel and begin chipping away the enamel covering decay, and your first experience may be one of surprise at the ease with which it can be done. You cut away on either side of the fissure until the opening has been sufficiently enlarged for the easy introduction of an excavator. With this you proceed to remove the *débris* of dentine—whatever will readily yield—first in a direction toward the sides and not toward the pulp chamber. In working toward the latter, it will be safer for the amateur operator to use a burr. As you proceed, it will be necessary to occasionally syringe the cavity, to remove the chips and dust. Some dentists are cruel enough to use cold water for this purpose, even with sensitive teeth. You will be sure to have water about blood warm for this. You may have this very easily in any weather, by a simple contrivance. Let a tinsmith take a piece of heavy zinc or sheet iron 5x20 inches, round the corners, bend each end 5 inches down, at a right angle; tack this against any convenient upright, place a small night lamp on the lower shelf, a small tin cup on the upper, and you have an arrangement convenient for keeping water at the temperature you wish.

The pressure exerted by the mere swelling of the *débris*, or

substances forced in from without in mastication, and held by the enamel shell, will often cause uneasiness or pain. The simple act of opening up the cavity, in such a case, by relieving the pressure that has been brought to bear on living dentine, or it may be the pulp itself, will give relief, and relief that may be made permanent by the use of proper protective means. The uneasiness gone or relived, the cavity may be soaked for a few minutes with the solution of morphia in creosote introduced on a bit of the cotton or spunk; then, that removed and the cavity thoroughly dried, a pellet of cotton saturated with sandarac varnish (or a gutta-percha pellet, if thought best, warmed over a lamp sufficiently to render it plastic) inserted, and the tooth dismissed to the dentist.

Care should be used in the application of the creosote and carbolic acid, that the pellet contains no excess; and where it is to be left in for a time the surface, after introduction, should be touched with a bit of dry spunk, so that there can be no overflow upon the soft parts.

In using the cotton and sandarac varnish, or other stopping, a care should be had not to press the pellet in too tight, and not to have it so large as to protrude beyond the margin of the cavity. Better a slight deficiency than too much material.

It will not be best, usually, for the physician to attempt the removal of all the decay, only that which can be brought away easily; that which is quite firm, especially over the pulp, had better be left to the superior skill and judgment of a competent dentist for retention or removal; for in some cases it is not best to remove *all* the decay, even for a permanent filling, but rather to *disinfect* and cover in with an air-tight stopping. All the physician need do in a case like this is to relieve pressure, and open up the way for the application of a soothing remedy and a temporary *dry* stopping. It is not often difficult to keep the saliva away so that a *dry* stopping may be made, by operating as follows: Have light muslin cut in squares of four to six inches; have one of these, or two together, folded in the form of a block about one by one and one-half inches, another in a small roll. The cavity has been sufficiently cleaned and disinfected; there is enough undercut to hold the filling you wish to introduce; the

cotton and sandarac, or the gutta percha, are within easy reach—remember we are supposing the tooth to be on the right side below. Now, take the cotton block, and, with your pliers, place it against the inner surface of the tooth and alveolar ridge, and instruct the patient to hold it firmly against the gum with the index finger of the left hand. With the index finger of your own left hand you hold the roll between the ridge and cheek. You now have the tooth isolated, for the time being, from the secretions of the submaxillary and sublingual glands on the one hand and the buccal on the other. By these means you may make a dry operation even in a wet mouth, if you are not unreasonably slow. You have ready bits of spunk of proper size which you pick up one after another, insert and remove until they return dry, and then immediately introduce the stopping. On the left side below, the patient, with the same left forefinger, holds the *roll* between the process and *cheek*, and the operator the block between that and the tongue. In operating above only one roll is necessary placed between the ridge and cheek to protect from the flow of Steno's duct. The patient usually will not carry the tongue to an upper tooth when the mouth is well open, if he does he may be otherwise instructed. If the pulp is nearly or quite exposed, and the pain can be by no local means subdued, the use of creosote, morphia, clove oil, carbolic acid, hot applications, etc., all proving ineffectual, if the case be in a plethoric subject there may be a chance for relief in blood-letting or catharsis; if a nervous, the internal administration of one or two full doses of quinine, with morphia or Dover's powder, may be of speedy benefit. It must be borne in mind that occasionally the dental, like other nerves, are the seat of intrinsic pain, to be relieved like neuralgia elsewhere, by medical or surgical treatment.

Remember also this one necessity, always in operating on a very sensitive tooth, that every substance used in application shall be *warm*, neither much above nor any below blood heat. The instruments should be kept on a warm shelf or dipped in warm water before using, and the cotton or spunk, with the medicants, should be held over a lamp before being introduced. I speak of extreme cases.

If when all has been done it is evident that the tooth cannot

be saved with a live pulp, shall you extract, or in common phrase, "kill the nerve?" becomes the question. I shall here state in brief what I believe to be a few plain facts and leave you to draw conclusions regarding pulpless teeth:

1. A large proportion of incisors, canines and bicuspids, teeth with single or double canals, may be saved for a time by an ordinarily skillful dentist, whether there is an alveolar abscess or not.

2. It will involve some patience, care and trouble on the part of patient as well as operator, and he ought to so understand it beforehand.

3. In some cases there will be a *good deal* of trouble, and possibly failure.

4. A pulpless tooth has not the same promise of long continuance and usefulness, as one in which the nerve tissue remains intact yet it may do well for many years, and front teeth especially should be given every chance of salvation.

5. The difficulties are increased and probabilities of success diminished as we go backward in the arch in our attempts to save pulpless teeth, and many people are unwilling to pay for the skill, time and trouble essential to success.

I have already expressed my aversion to the use of arsenic for purpose of destroying pulps, but if you chance to employ the agent there are some points not generally understood among doctors but very necessary to keep in remembrance, regarding its application.

It should be used in the form of a paste made with a little glycerine or mucilage, and best with the addition of a morphia salt. It should be applied by means of a small pellet of cotton directly to the pulp which must be quite exposed. The least particle will be sufficient if it touches the right spot. The pellet is to be carefully placed in position and kept there by another pellet of cotton and sandarac varnish, so that not any shall by any possibility escape from the cavity. After the application, the patient should go to the dentist within a few days.

As physicians, are familiar with the use of ether, you may if you will give a sufficient quantity, enter the pulp chamber with a sharp excavator or drill, remove the pulp with a suitable burr, cauterize the nerve stumps with carbolic acid, insert a loose pel-

let of cotton and send your patient home with instructions to go to a dentist within a week.

Where a cavity of decay causing trouble in a tooth is located on one of the proximal surfaces, it will often be difficult to give it proper attention without cutting away the semicircular piece of enamel over-lying it on the face of the tooth. Frequently the decay exists high enough up so that is an easy thing to do, the shell over it being quite thin. In doing this you will only anticipate the dentist, and give yourself light *into the affected part, and room to work.* A few words as to the *manner* of *handling instruments.* As a rule, dental instruments are to be held as one should properly hold a pen, between the thumb and the first and second fingers. The "Spencerian" position, wherein the second finger drops a little below so that the pen rests upon the edge of the nail, is the best for the complete control of any light instrument. It insures steady movement, accurate touch, and sufficient force for all ordinary work. Burrs and drills are to be held with the large end in the palm of the hand which exerts the necessary pressure, while the thumb and fingers revolve the instrument from left to right.

A Few Statements in Brief.—There are some substances used in medicine that are very injurious to teeth, and among them are the *mineral acids* which should be given with great care, largely diluted and followed quickly with water; the tinct. ferri chloridi which should scarcely be given at all, for it almost certainly not only discolors, but roughens enamel, and acts as a strong astringent on the gums, disturbing their relation with the necks of teeth. The various preparations of mercury also produce more mischief than either physicians or their patients are aware of.

It is well to be extremely cautious in ascribing pain to a particular lesion in the tooth of any pregnant female, because such pain is apt to be entirely of a neural and reflex character.

Both physician and dentist should avoid tooth extraction, if possible, where there exists the condition of pregnancy. This state, with its important interests at stake, and its prenatal influences at work, is no more to be ignored here than elsewhere. (See Dental Cosmos, Jan. No., 1879.)

In deciding upon what shall be done in the case presented, the

physician will have often to take into account the disposition and prejudices of his patient. He has to deal with all grades of ignorance and obstinacy, and circumstances, perforce, will alter cases. He cannot always act up to the ideal standard which the dental specialist may set up. He may sometimes have to extract a tooth under protest, or take the chances of losing paying patronage, and most men under such circumstances will sacrifice the ideal—and the tooth.

If a person is obstinately bent on losing a tooth, he will find some one to apply the forceps if you do not. The "other fellow" will most likely rejoice in this opportunity for relieving a suffering fellow-creature, and besides take the opportunity to examine the man's tongue and prescribe for his "liver complaint." With the intelligent you can use reason, inspire confidence, and be conservative, but with some people you can't.

It may be that the city dentist, with a "select" patronage, who claims to seldom use forceps, will think I have given herein too great latitude to that instrument, but I am writing not for him, but for the country doctor; that man of many labors, who must do something of nearly everything; "in journeyings often," in perils of winds and waters, in "perils by the heathen," in the wilderness, and "among false brethren;" "in weariness and painfulness," in "watchings often," and cold and heat and storm.

In writing this I have had his interest constantly in my mind, with a view to rendering him some practical assistance. I have not suggested the purchase of anything but that I think will *pay* him, not merely in satisfaction, but pecuniarily. That pertaining to the teeth is but a small fraction of the work to which he has to give his attention, and whatever he has in the way of dental tools, and does in the line of dental work, must be limited to things simple and essential.

WENONA, ILL., Nov. 22, 1879.

ARTICLE V.

REPORT OF A CASE OF LITHOTOMY. By A. E. BALDWIN, M.D.

Read before the Military Tract Medical Society.

I was consulted June 14, 1879, by Frank Powell, a young man aged 19, in regard to his ailments. Said he had not been *well* for many years; had always been troubled the same as now, only not so severely as for the past three weeks, during which time he has been suffering severely from pain in the lower part of the abdomen, always dull and heavy in character.

Has lost flesh rapidly for the last three weeks, is now quite emaciated and anæmic.

Upon inquiry, I found he had to urinate very frequently, many times wanting to, but unable to do so. Sometimes while urinating urine would stop suddenly; felt no itching about penis, neither were the testicles retracted.

I told him I suspected vesical calculus, and suggested the use of the sound; after urging, he consented, and introducing the sound I found the prostate much enlarged. As soon as the sound entered the bladder it struck the stone with so decided a *click* that the patient heard it. The stone was apparently of pretty large size, and I advised him to have it removed. By request of the young man's guardian, I took him to Dr. J. Todd, of Galva, who fully confirmed my diagnosis. I gave the patient opiates and mild laxatives, and fixed upon June 24th, 1 P. M., for operation. As he lived some distance in the country (8 miles), arrangements were made to have the operation performed and patient cared for here at the Toulon House. Advised patient to keep as quiet as possible, and I came to town the day before hand.

June 23d.—Patient came to town; gave him at bedtime, ℥vi. (24 c. c.) of castor oil, which operated well in early morning. Ordered him an injection at 10 A. M., followed by one-sixth grain morphia.

June 24th, P. M.—Having arranged a table and covered it—as per authors—I proceeded to the operation. My assistants were Drs. D. H. Alvis, gave ether; J. F. Todd, staff holder; E. R.

Boardman and J. B. Ingals, held legs in position. Drs. R. O. Phillips and W. T. Hall were present by invitation, to witness the operation. About 2:20 commenced giving the anæsthetic and at 2:30, having placed my instruments in a chair to reach them handily, I shaved the perinæum; then made my first incision, beginning just to the left of the raphe, about 1¼ inches in front of the anus, carried it obliquely outwards and backwards, terminating it a little posterior to and about midway from the tuberosity of ischium and anus.

Second incision was made with forefinger of left hand in anus and beginning about ½ inch farther back than first—cut quite deeply—was compelled to ligate transversalis perinei artery. Then introduced fore-finger of left hand into the wound, sought for the groove in the staff; finding it, I traced the groove as far back as I could to be sure and avoid the bulb of urethra and artery; then, pressing the nail well into groove and finger in front of rectum, I cut into the groove. Then, placing the probe-pointed knife in groove, and, giving it the same angle as the wound, I grasped the staff, pulled it well up under the arch and pushed the knife forward into the bladder.

Introduced finger into bladder over staff, then withdrew staff and felt for the stone; found it lying, seemingly, in a pouch just back of prostrate gland. Introduced forceps over finger, and, with the aid of the finger in the bladder, grasped the stone. The spread of the forceps showing that we had a very large stone, after repeated efforts of dilatation and traction, found I could not get the stone out of present opening nor crush the stone.

I then cut across the raphe, converting it into a "medio-lateral" operation, and, not succeeding then, was compelled to convert it into a "bi-lateral" by making a similar incision on right side as that on the left, not quite as long externally, and, after repeated efforts, dilating wound and turning the stone, I succeeded in removing it. I then washed out the bladder with tepid water, and, as there was some oozing from the wound, washed out the wound with ice water, and had patient conveyed to bed—previously prepared and well covered.

The stone was oblong, rough and warty, about 6.5 ctm. in

length, 5 ctm. in breadth and 3.3 ctm. thick; weighed about 3 oz. Patient lost 3 to 5 ounces of blood.

7 p. m.—Found patient in considerable pain and a little feverish; ordered him pills of morph. (¼ gr.) as often as necessary to keep him easy. Washed wound and dressed it with carbolized sol. (1 to 60) after anointing buttocks with olive oil to prevent irritation.

June 25th a. m.—Pulse, 92; temp., 37 2-5°. Says he is very comfortable. Treatment continued, with patient taking milk 60. every two hours.

P. m.—Pulse, 88; temp., 37 4-5°; resting well; has not had morph. for several hours.

June 26th.—Was called up during the night to draw off the urine, which I did by introducing catheter through the penis without any serious pain; provoked a little flow of blood from wound.

7 a. m.—Pulse, 90; temp., 37 1-5°; patient prospering nicely, and everything favorable.

1 p. m.—Pulse, 110; temp., 40°; skin hot; feels well; only lame and head aches. Ordered cinchonidia sulph. 0.4 every 1½ hours.

3 p. m.—Pulse, 122; temp., 41.5°; skin very hot and dry; abdomen tender and swollen; has had chills twice. Tongue coated and dry; nervous, restless and delirious; continued treatment with addition of

℞ Tr. aconit. rad.....		26
Pot. chlorate.....		66
Tr. opii.....	1	33

M. Sig. In syrup every hour as long as necessary.

7 p. m.—Pulse, 110; temp., 40°; some improvement.

11 p. m.—Pulse, 85; temp., 39°; skin somewhat hot but moist; says he is comfortable, but tired. Throat somewhat sore and dry; thinks he can sleep.

June 27th—6 a. m.—Pulse, 85; temp., 37.6°; patient rested well; throat feels better; skin and tongue moist; abdomen better, only complains of being tired.

11 a. m.—Pulse, 84; temp., 36.7°; skin moist; has eaten crackers in milk.

6 p. m.—Pulse, 85; temp., 37.9°.

10 p. m.—Pulse, 82; temp., 37.3°.

June 28th—9 a. m.—Rested well during night; urine comes through wound again. Pulse, 80; temp., 37.3°; tongue cleaning; not much swelling about wound.

2 p. m.—About same; ate oysters to-day.

9:30 p. m.—Same. Ate some chicken.

June 30th.—Gave injections and removed a large amount of fæcal matter.

July 3d.—Water began coming through urethra again; wound healing very fast; continued to dress with carbolic wash. Continued to improve and the 11th of July patient was discharged, wound all healed. Has gained eight pounds since operation, (had lost twenty-six in the five weeks previous to operation.)

July 19th.—Heard patient was doing light work; gaining fast.

Dec. 15th.—Heard from him a few days ago. Says he is perfectly well; weighs more than ever before, and can do as much work as any man in the country.

THE AUDIPHONE.—Frequent inquiries regarding this much-vaunted invention induce me to state that Messrs. Sharp & Smith of this city have been carefully testing the audiphone for several weeks, but thus far they have not found patients benefited by it. Out of one hundred and fifty successive cases of deafness, in which they have given it a trial, they report that not a single one has noticed any benefit in its use.—E. FLETCHER INGALS, M.D.

PROF. SARAH HACKETT STEVENSON having been obliged to ask for a year's leave of absence from the Chair of Physiology at the Woman's College, Prof. F. L. Wadsworth has kindly consented to supply her place for the present session, and we may add that his course of instruction is giving very great satisfaction to both class and faculty.

Clinical Reports.

NOTES FROM PRIVATE PRACTICE.

ARTICLE VI.

My Struggle with a Tape-worm.

Tape-worms are, comparatively speaking, quite a common affection in most parts of the United States. Probably every practitioner of medicine has been called upon to treat more than one case of this, sometimes, troublesome disorder, and having successfully removed the worm, pins his faith to whatever drug he may have used. The removal of a tape-worm creates quite a little sensation among the friends of the party thus relieved, and the fortunate doctor finds his office besieged by a crowd of curious people and gains quite a little notoriety thereby. It is not then to be wondered at that on attempting a second time to dislodge one of these pests, he recalls to mind his former success, and tries as nearly as may be to follow the same plan of treatment

That the doctor's efforts are usually crowned with success is true, but it is also a fact that in many cases the results are very unsatisfactory, and the patient becoming weary, after repeated trials, calls another physician. This is apt to make a young practitioner feel somewhat discouraged, and it is additionally disheartening if the case happens to fall into the hands of some one with whom he is not on friendly terms, who secures the prize and gains credit through his failure. My struggle with a tape-worm will perhaps be of interest to some of my brother practitioners, and, I trust, suggest to them a readily accessible, though not a new plan of treatment.

A lady called at my office to consult me in regard to her little girl, about seven years of age, who had been complaining for

several months. She explained to me that one or two doctors in the city had prescribed for the child several times, but their medicine seemed to do her no good—in fact, she was growing weaker every day. The little girl was very slender, and her face wore an anxious expresssion; her appetite, the mother informed me, was ordinarily very poor, though at times she ate ravenously. For about a week her bowels had been quite loose. "What was the character of her passages?" I asked. "Oh, I did not notice particularly," she replied, "only occasionally pieces of something white, like curdled milk; she is very fond of milk." The stools were examined, and links of tænia discovered. The parents were very much alarmed when this was made known to them, and were anxious to have that "awful thing" taken away as soon as possible. This I promised to do.

It having been some time since I had had a case of this kind to treat, and wishing to proceed against this hidden foe in as scientific a manner as possible, and according to the latest and most approved methods of warfare, I selected from my library several works which I knew treated to a greater or less extent on this subject, and settled myself to a thorough examination of them. I threw all former views to one side, and, wholly unprejudiced, searched earnestly and anxiously for the drug which was to cause this trespasser on private grounds to move on.

I first took up "Stillé's Materia Medica," and turning to the index of therapeutics, under the heading of "Tænia" I read: "acidum sulphuricum, æther, antimonii et potassii tartras, brayera, chenopodium, filix mas, granatum, kamula, oleum olivæ, oleum tiglii, pepo, stanni pulvis, tanacetum, turpentine."

I must confess to a feeling of faintness at sight of such long list of ammunition from which to select. To my mind this array included some articles as powerless as a blank cartridge, and others which, comparatively speaking, were like a charge of dynamite. However, I read what Stillé had to say in favor of each drug, and coming down to filix mas I came across this sentence, "Male fern and its preparations are almost exclusively used for the cure of tape-worm." I kept my finger on this and finished the list. Stillé's remark in regard to male fern haunted me. If this drug was used "almost exclusively" it must be the best, and if it was

the best then had I found what I was in search of. But ever careful to be in the right, I opened Ringer's Therapeutics to learn his opinion, and found "Male fern is generally considered the fittest treatment for tape-worm."

Not yet satisfied, I turned to "Diseases of the Intestines and Peritoneum," Wood's Library, and here Ransom had written, "The male fern is perhaps the oldest and most widely known vermifuge, and of late has grown into much favor." Bennett in his Clinical Lectures said, "Of all the vermifuge remedies proposed for the expulsion of tape-worn, I have found the male shield fern the most effectual." Speaking of this drug Phillips (Materia Medica), wrote, "Its value in cases of tape-worm can hardly be overestimated." And Watson in his "Practice of Physic," "But the best and most trustworthy of all, in my judgment, is male shield fern." What more could I want? All these writers pronounced the same verdict. I was satisfied, but espying Flint's "Practice of Medicine" in my book-case, I took it down and found him testifying as follows: "The male fern is a tænifuge, the efficacy of which rests upon the testimony of many observers of large experience. In my own experience it has proved promptly efficacious." Already decided in favor of filix mas, this added testimony made me only the more firm, and I immediately resolved to clear the ground for action.

Having read in some of my books that, if I would make the result doubly sure, I must starve the patient for a few days, I put the little girl on the lightest known diet, viz: beef-tea. I at first thought of putting her on a water diet, but wishing to give the male fern a fair chance adopted the beef-tea. I permitted her to have nothing else to eat for forty-eight hours, and on the evening of the second day gave the famished child a full dose of castor oil. The following morning, not allowing her any breakfast, she was given a dessert-spoonful of an equal mixture of the liquid extract of male fern and mucilage. Learning that the stomach tolerated this dose, and feeling confident that now, having followed directions to the very letter, the enemy would not be long in showing the white flag (himself), I was happy, and going to make a call on an especially aggravating chronic case, I surprised this patient by my unusually jovial disposition. Returning to our little

friend about four hours after the first dose was taken, and finding no apparent result, I gave a second dose and laughing away the doubts of the parents, told them to let me know when the tape-worm had passed.

In the evening the father called at the office and said that, with the exception of one important county, the returns were all in. I told him it was most too early to expect returns from back counties. He went home. As nothing resulted from this effort, I told the parents that possibly the medicine was not quite so fresh as it might be, and they should let the child resume its regular diet, and we would try again in a few days. I also prescribed a tonic mixture to be taken three times a day.

At the expiration of two weeks I repeated the procedure, with precisely the same result. This was certainly disheartening. The little girl looked as though, after due consideration, she had decided to keep her tape-worm. I was afraid to increase the dose or even try again, lest I should be under the painful necessity of making an autopsy to obtain my specimen. I had lost faith in filix mas. However, I assured the anxious parents that, being satisfied the mild means we were using were not going to have the desired result, we would have to resort to something different.

Fresh pumpkins were coming into market; procuring one of these, I had a part of the seeds deprived of their outer envelope and beaten into a paste, with fine sugar. Three weeks after the last attempt, the child was permitted to eat as much of this paste as it could be induced to take, without any previous preparation whatever. The day following I received word from the mother that the worm was being passed, and wanting to know what she should do. I replied, "Let it pass." In the afternoon the father came into the office, looking pale and haggard; he seemed older by ten years than when I saw him the day before. He grasped the back of a chair for support, and appeared to be laboring under some terrible shock to the nervous system.

"Why, my dear fellow!" I exclaimed, "what is the matter; what has happened?" He raised his eyes to mine for a moment, and dropping them, said, in a voice shaking with emotion, "It is gone." "Gone!" I cried; "what, the child?" He glanced

quickly up at me, and with a faint smile playing over his countenance, answered, "No, the worm."

And so it proved; the tape-worm had changed its mind, and not being pleased with its cool reception, had drawn its long chain of white links back into the child's intestines. But another hearty meal of the pumpkin seed paste brought away the intruder, head and all. And ere long, lest he should escape us a second time, we had fifty feet of tænia solium floating peacefully in equal parts of alcohol and water.

G. B. PRATT, M.D.,
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ELKHART, IND.

SALICYLATE OF IRON.—Dr. Wallis White (*Glasgow Medical Journal*, Aug., 1879) prepares the salicylate of iron by dissolving together sulphate of iron 1.6 grams, salicylate of soda 2.00 grams, and acetate of soda 1.3 grams, in 30 grams of water. The solution has at first a pale port-wine appearance, which darkens on exposure to the air; it has a pleasant taste, and 30 grams contain 2 grams of salicylate of iron. Its primary action seems to be to promote secretion, stimulating the skin. It does not constipate the bowels, but rather corrects the alvine secretions. As a prophylactic against septicæmia after surgical operations it is valuable. It promotes perspiration, cleans the tongue, lowers the temperature, and reduces the pulse. It may be administered with freedom and in large quantities in cases of anæmia, without interfering with digestion. In skin diseases also, and in desquamative nephritis where the digestive organs have become weakened, and a salt of iron is indicated, its powers are very marked. Salicylate of iron seems to combine the astringent powers of the iron, but in a minor degree to the sulphate or perchloride, with the antiseptic, antipyretic powers of the salicylic acid. If the preparation is long continued, some of it passes out unchanged with the urine.—*Practitioner*, Oct., 1879.

Domestic Correspondence.

ARTICLE VII.

PHILADELPHIA LETTER.

Messrs. Editors:—At the time I write the activity of the medical profession in this city appears to be chiefly displayed in the form of lectures at the colleges and hospitals and in public and private practice. But few papers of general interest have been read before our various societies during the autumn and not many articles have been published in our local journals of such a character as to deserve special mention. It may be supposed that the energies of our working men have been expended in the hospital ward, the laboratory and the studies, and that the fruit of their labors is to appear later in the season. Among the papers of most general interest which have been read at our societies during the past six months, are two which are worthy of notice. The first of these was a paper by Dr. Albert H. Smith, one of our best known gynæcologists, on "The Uses of the Hot Water Douche in Parturition," read before the County Medical Society. Dr. Smith is inclined to the belief that hot water possesses the power of absolutely controlling hæmorrhage from small open vessels and from oozing surfaces in cavities where continuous irrigation can be kept up with the temperature of the water maintained at 110° to 115°, and this without aid from the muscular contractility of the tissues. In order to obtain the benefit of the hot douche in hæmorrhage in pregnancy, the free and unobstructed play of the muscular contractility of the uterus is first required and next, especially, free access of the stream directly to the bleeding surface. The uterus must first be emptied. No special apparatus is required; an ordinary Davidson's syringe,

a fountain or bag syringe, or even a rubber tube, which every country practitioner should carry with him for many useful purposes, may be employed.

The hot water douche may be employed (1) to relax a rigid os and hasten the first stage of labor. (2.) To produce prompt and vigorous condensation of the uterine walls after expulsion of the fœtus. (3.) To arrest hæmorrhage from laceration in the passage of the child through the pelvic canal. I wish I could give a further account of this paper, one of the most practically valuable which has been brought out by the general interest in hot water as a hæmostatic that has prevailed during the past year. Any of your readers who, not having seen Dr. Smith's paper, would like to read it in full will find it in the *Philadelphia Medical Times*, Vol. IX, 1879, p. 541.

Scarcely of less interest is the paper of Dr. John B. Roberts, read before the same society, on "Paracentesis of the Pericardium." Dr. Roberts considers this operation not only advisable but necessary in many cases of cardiac trouble accompanied by effusion and as not at all difficult to perform. His paper has called forth much comment and he has been supported in his views by Professor Pepper in a paper published in the October number of the *American Journal of the Medical Sciences*. Within a week or two Dr. Roberts has published a monograph with the same title, giving the results of the latest experience in this operation.

Although the journals have not recently teemed with papers by Philadelphia men, yet this has not been an idle year and the number of new works of value and of new editions of old works has not been small. Agnew's great work on surgery, the first volume of which appeared near the close of last year, is approaching completion and in wealth of information, particularly of a statistical sort, is without a peer in works of its kind, though in beauty of style and literary arrangement it is not equal to others. Professor Ashurst, who is Professor Agnew's colleague in the university, occupying the chair of clinical surgery has just brought out the second edition of his "Principles of Surgery." Professor Harrison Allen has long been engaged on a work on anatomy, of which Dr. Shakspeare has written the histological introduction. This *opus magnum* is at length to see the light,

as I believe it is to appear early in the year. Those who know Professor Allen's painstaking, laborious and thorough method, expect the appearance of this work with great interest, and confidently hope for a volume which will add to the credit of American medical science in a field hitherto left uncultivated.

Professor Duhring's "Treatise on Diseases of the Skin," which has for some time been out of print, is about to appear in a second edition, revised and brought up to the most recent standard of knowledge of these affections, and of course necessarily enlarged. Duhring's "Atlas of Skin Diseases," a production of permanent value, in which the profession of this city feel a certain pride, not unwarranted by the character of the work, continues to appear in parts from time to time, and is, I believe, a little more than half way to completion. In a very different class must be reckoned the series of "Health Primers," of which various volumes, under the editorship of Dr. Keen, and chiefly written by Philadelphia men, have been making their appearance during the last six months. Although these works are written in a popular style, they contain much of interest and instruction for the medical man, and are not to be tossed lightly aside as unworthy of serious notice. In this respect they compare favorably with the primers of a similar sort issued in England, one of which lies before me as I write, which it would not be too much to denominate trashy. Some of Dr. Keen's "Health Primers" have been written by specialists of standing, and those of Dr. Burnett on the ear, Dr. Harlan on the eye, and Dr. J. W. White on the teeth, may be confidently recommended as containing just the sort of information on these special organs which specialists alone can give, and which is hardest to obtain without going more deeply into these subjects than the average doctor's time will allow. We of the profession must be alive to these points, or we are apt to be caught up and our ignorance exposed by clever laymen who have gained the latest fruit of modern science from these little manuals. I dare say, however, that many of your readers have seen the "Health Primers," for their sale has been enormous, and the publishers, I fancy, have reason to bless the day when their enterprise was undertaken.

One more Philadelphia book of recent date may be mentioned

which has gained great success—that is, Stillé and Maisch's "National Dispensatory," of which the second edition is rapidly passing off, although scarcely half a year has elapsed since its first publication. To one of its authors, Professor Stillé, this work is peculiarly honorable, because it has been undertaken and carried through at an age when most men have laid aside their more laborious occupations and are beginning to enter into the rest which they have earned by their labors, and to enjoy whatever laurels they may have won. It is now about a year, I think, since Professor Stillé handed in his resignation to the trustees of the University of Pennsylvania, and was about to retire from the Chair of Practice which he has filled so well for the last seventeen years, when he was induced, by the strenuous efforts of the students and alumni, together with the friends of the institution, to remain during a somewhat longer period. The reason assigned for Professor Stillé's resignation of his important position, when to all appearance he was at the height of his usefulness, seems to have been a certain resolution, made many years ago, to the effect that when he had reached a certain age, sixty-five I think, he would retire, although he might be in the enjoyment of all his faculties. The origin of this self-sacrificing resolution is, I venture to think, to be found in a certain yellow and discolored pamphlet, dating somewhere about 1832, and containing a vigorous protest against the retention of the Chair of Materia Medica in the university by the then occupant of that position. This protest was signed by a committee of students, at the head of which appears the name of Alfred Stillé. It sets forth in forcible language the grievances of which the unfortunate occupants of the benches were the sufferers, stating that although the subject which Professor C—— was supposed to teach was materia medica, yet a number of his lectures were occupied with a discussion of Galen's views on the anatomy of man, as derived from dissections of monkeys. Moreover, when at last the true subject of the lectures was reached, no allusions were made to writers of a later date than Dioscorides and Avicenna, as the venerable professor considered all discoveries of a later date as vain, trifling and of little account. Moreover, it was added, if my recollection serves me, that age had so far impaired the utterance of the pro-

fessor that but little of what he said could be heard even by the acutest ear. However, as the chair was at that time worth some $10,000 a year to its holder, the superannuated occupant was removed with difficulty, and I suppose that the memory of that student experience caused Professor Stillé to resolve not to dim the luster of his reputation by lagging superfluous on the stage. That he is far from even the beginning of a decline of his powers is seen in the work which he has just completed, to which allusion has been made, and that he may long be spared to adorn his chair is the fervent hope of all friends of the university. The Jefferson College has sustained a severe loss in the death of Dr. J. Aitkin Meigs, professor of the Institutes of Medicine. Professor Meigs was known to the scientific world generally rather as an ethnologist than as a physiologist, having written little or nothing upon the latter subject. As a lecturer he was deservedly popular, on account of the earnest eloquence of his style and the abundant illustration which he introduced into his lectures. He was the first lecturer in this city, and one of the first in the country, to introduce vivisectional illustrations. Although bearing the same name, yet he was in no way related to the other physicians of the Meigs family who have practiced in Philadelphia for several generations. It appears, by the way, to be one of our characteristics to produce successive generations of medical men of ability. Charles D. Meigs was the famous obstetrician and rival of Hodge of fifty years ago. John F. Meigs, his son, is the joint author with Professer Pepper of the well-known "Meigs and Pepper on Diseases of Children;" while a grandson of the family is a well-known practitioner.

A new society has recently sprung into existence, called the "Academy of Surgery." Professor Gross is believed to be the originator of this association, which is to be very select, only numbering some thirty members. I hope to be able to inform your readers further regarding this and our other societies at some future date. PHILA.

Dec. 17, 1879.

ARTICLE VIII.

JAPANESE SURGERY AND MEDICINE.

Messrs. Editors :—I made an attempt, some time since to learn the state of surgery and medicine among the Japanese. The effort did not yield very brilliant results; yet the ideas of such a people are always of interest to thoughtful men, and are worthy of consideration in the study of human progress.

My information is derived partly from portions of an illustrated native Japanese work, translated for me by a lady, long resident in Japan, and partly from the kindness of Dr. H. Foulds, Physician of the Fukiji Hospital, in Tokio.

A favorite Japanese medicine for diseases of the alimentary canal is prepared by the tribe of Ainos, in the great island of Yezo, in the north part of the empire. These Ainos are a race of heavily bearded men, surrounded by the half beardless Asiatic races. Many ethnologists declare that in features and in physical structure they belong to the Caucasian race; but no one knows how they came to be flung off among the Mongolians, so many thousands of miles from the rest of the stock. However this may be, they were the aboriginal inhabitants of the whole of Japan, but about six hundred years before Christ they were invaded and driven north by the present dominant race of the empire, so that the Ainos are confined to the island of Yezo, and are only about fifty thousand in number. They pay a tribute of seals to the Japanese government, which they catch in the following curious manner: A decoy is made by taking a small float and erecting a sort of plume or bush upon it, which looks like a fox's tail. Three men go softly out in a canoe. One paddles the craft, another lets the float out with a string, which drifts away on the water, the third stands with a bow and arrows. The plan is to "toll" the animals. The seals, seeing the plume waving above the water, get their curiosity excited, much as the western antelopes do when "tolled" on land by an analogous device, and come swimming toward the plume. The man in the canoe draws the float gradually toward him, with the seals

following it, until he gets them near enough to be shot by the archer.

The inland Ainos, however, are the ones who manufacture the popular medicine above referred to. They hunt female bears by first catching the cubs, and using them as decoys to catch the mother. They then take the heart, lungs, kidneys and liver, and, if I understand them rightly, make a sort of sausage meat by chopping them all up together, gall bladder included, and drying it in cakes. This is purchased as a medicine all over the empire, and is taken by simply cutting of slices and eating them. It is said by the patients to be "very bitter, like the gall of a chicken."

The aboriginal Japanese surgery was very rude, and had no anatomical knowledge as a basis. They used the moxa; and our word is simply a modification of a China-Japanese word for the same thing, viz., "Mō-hŭsa."

They bleed, and use a style of lancet supposed to be derived from the old Dutch traders two hundred years ago. Syphilis was known and described three centuries ago, but it is not clear what the most ancient treatment was. It is certain, however, that foreign surgeons found them not long since using enormous doses of mercury, so that the deleterious effects of the drug were very common.

Their peculiarly tough and porous paper is very valuable in surgery. Dr. Foulds uses it for bandages, wrappings, compresses and absorbents, as well as for holding antiseptic applications, and also for sponges and towels.

The doctor thinks the utter ignorance of anatomy shown in Japanese medical works is due to the horror of taking animal life inculcated by the Buddhist religion, by which investigators were prevented from even dissecting inferior animals to obtain light on human structure.

On the whole, the Japenese do not seem likely to furnish any valuable new ideas in medicine or surgery, but the flora of their country is extremely rich and varied, and it is probable that a thorough and skilful examination of their native plants would furnish useful additions to our materia medica.

EDMUND ANDREWS, M.D.

Reviews and Book Notices.

ARTICLE IX.—HYGIENE AND PUBLIC HEALTH. Edited by Albert H. Buck, M.D. New York: William Wood & Co. Two volumes. Octavo.

[Concluded from page 655, Vol. XXXIX, No. 6.]

The second volume is opened by a lengthy paper by Dr. Roger S. Tracy, of New York, on the "Hygiene of Occupation." This treats of the various diseases which are produced by different trades and occupations. Among the diseases produced by chemicals is noticed a curious eczema which is caused by sulphate of quinine. In the great factory of Powers & Weightman this eruption occurs in about 90 per cent. of the new workmen, three months after entrance. "The majority are only affected once, while others have two or three attacks. Some cannot become accustomed to it. It is exceedingly rare for any one to have it if working in the dry materials. The vapor from boiling solutions seems to be the chief cause." The bearing of this upon the mode of action of vegetable organic matters that are highly nitrogenized, and operating in connection with heat and moisture, hardly needs comment.

Our author finds that "fat-renderers, lard-refiners, bone-boilers, glue-makers, fertilizer-makers, pork-packers, soap-makers, oil-pressers and cheese-makers are exposed to offensive gases, but, so far from suffering in health on that account, appear to be actually benefited." Scavengers, also, "are in general a healthy class of men;" all of which corresponds exactly with our experience in Chicago. Physicians are credited with a very high rate of mortality. "In England the average age of physicians at death is given as 45. Old physicians are rare."

The Hygiene of Camps forms the subject of a valuable paper by Assist-Surgeon Charles Smart, U. S. A., an author who has written an interesting essay on "Malarious Waters and Mountain Fever," published in the *American Journal of Medical Sciences*, Jan., 1878. He naturally recurs to the same line of thought when treating of the water-supply and diseases of camps. By a long and laborious train of chemical research, associated with attentive clinical observation, the doctor succeeded in tracing a connection between mountain fever — which is essentially a malarious fever — and an excess of "organic ammonia" in the water used by the patient. This "organic ammonia" is of course, in the trackless wildernes of the West, derived from the decomposition of vegetable matter. Washed from the air by rain and snow, even the mountain snow-water yields an appreciable quantity of the impurity. It is this water and the resulting spring-water, which causes the fever, "an adynamic remittant, for which the writer has suggested the name of *aquamalarial* fever." Thus far the author's discussion of malaria is quite unobjectionable, but in a subsequent portion of his essay he resumes the subject (pp. 145, 147, Vol. II.) and discourses of malarious germs in a manner that fills the thoughtful reader with astonishment. The doctor presents, as illustrations of diseases caused by air-borne vegetable spores, autumnal catarrh and rhus-poisoning, while cholera and typhoid fever are connected with specific germs, and malarial fever is to be in like manner referred to the action of vegetable germs. He believes "that certain germs exist and multiply in the decomposing vegetation of the soil, * * * and that when these find their way into the system and there meet with the vegetable tissues susceptible of the stage of decomposition which is native to them, they increase and multiply, developing according to circumstances, the various grades of malarial disease. * * * It is only in the alimentary canal that the malarial germs can find that fermentable vegetable matter which is necessary to their development. And as this supply of vegetable matter, susceptible of a certain decomposition, is not continuous in the system but intermittent, we have a hint as to the origin of one of the singularities of malarial disease," etc., etc. (pp. 146–7, Vol. II).

The above quotation affords a fine example of the charmingly inconsequential logic which carries captive the devotees of the germ theory. Let us analyze a little. Hay fever and rhus-poisoning are caused by the action of vegetable spores; but the action of the spores in those diseases is upon the surface of the body, and is of a directly irritant character, producing local inflammations. Spores are very tangible things, and the spores of all plants are likewise tangible and traceable. If now malaria is caused by vegetable germs, those germs must be spores of some kind. But in malarious diseases we can discover no evidence of inflammatory action upon either the inner or the outer surfaces of the body. If the intermittent paroxysms of fever are due to intermittent growths of cryptogams in the intermittent supplies of vegetable matter which enter the alimentary canal, the paroxysms should occur as often as the meals—but they do not; nor is there a particle of evidence of any peculiar cryptogamic intestinal vegetation in malarial fevers. The microscope does not reveal the presence of any such parasites in the fluids or cellular structures of the body. As for invisible growths and invisible germs we have no right to assume their existence as long as other hypotheses, based on actual observation, are sufficient to cover the ground. Our author seems to admit that his malarial germs may contribute to the living processes of the leaves of plants. But vegetable cells do not feed on other living cells; they consume inorganic and dead organic matter, but they are not known to absorb living germs. If vegetable spores and germs are the cause of malarial fever, there is no reason why human beings should ever become acclimatized. Spores and seeds will grow wherever they find warmth and moisture, such as the liquids of the human body always afford. Accordingly, the victims of hay fever and rhus-poisoning always suffer with each recurring crop of spores. But when disease is caused by substances which are capable of mingling, in the form of liquid or gaseous non-living matter, with the plasma of the blood, and when such substances enter the living cells, those living structures at once experience a modification of nutrition. This modification of nutrition constitutes the disease. If the disease were caused by the presence of vast numbers of living parasites in the liquids of the body, competing with the

native cells for place and for food, the characteristic phenomena should be those which belong to embolism and to starvation. But there is nothing of the kind. The phenomena are those which belong to alterations of nutrition causing alteration of the functions of the natural cells. To this kind of change all the symptoms of infective diseases can be referred. As for "germs" too small for detection, we can know nothing of their natural history. We can only infer their presence from the consequences which should follow their introduction into the system. Since those consequences are mere perversions of the natural functions of the living cells, and since those functions are dependent upon the quality of the nutriment which is supplied to the cells, and since that nutriment always reaches the cells of the body in the condition of non-living, unorganized matter, it follows that the infective matters which excite infective diseases must be in that condition. They cannot be germs, alive and capable of indefinite multiplication. The living cells of the body are the only germs in the case; those cells always exhibit a tendency to adapt themselves to changes of nutriment, so that after a time they may exhibit a certain degree of healthy function, even though the blood be still contaminated by malaria. This we call acclimatization.

In accordance with this hypothesis it becomes very easy to see how malarial diseases are so largely dependent for their evolution upon changes of temperature and moisture. The cells of the tissues may only be so modified by their malarious diet that they can still perform their ordinary functions until the additional disturbances implied by fatigue or the action of damp night air, are superadded, when their equilibrium is completely overthrown and the phenomena of active disease appear. Quinine and other anti-periodics then become useful, not because of "germicide" properties, but by reason of their favorable effect upon the nutrition and defecation of the cells which are the seats of disease.

With these criticisms we will pass by the remainder of Dr. Smart's valuable paper — valuable in spite of its defects — and will call the attention of the reader to an essay on the "Hygiene of the Naval Merchant Marine," by Dr. Thomas G. Turner, Medical Director, U. S. N. Having seen considerable of both branches of the service, we can testify to the accuracy of the author's

observations. His paper calls attention to the great hardship and danger which is produced on shipboard by crowding, dampness, improper diet and foul air. It seems, indeed, as if the sailor were compelled to encounter everything that ignorance and despotism can devise for his harm; and all growing out of traditionary errors on the part of non-medical officers regarding the essentials that are requisite for health and discipline. Dr. Turner's essay is so good and leaves so little to be desired, that it is with a feeling of real regret that one finds its closing pages disgraced by a miserable fling at the clergy for their philosophical position regarding the social management of syphilis. The doctor is evidently very much under the influence of the bias of position, and, like too many other narrow specialists, has not yet learned to examine this subject with the eyes of a philosopher. The whole paragraph should be omitted in future editions of the book.

The most interesting essay in the entire work is the paper on the "Hygiene of Coal Mines," written by Henry C. Sheafer, Esq., "Coal Editor" of *The Miner's Journal*, Pottsville, Pa. The author places before his readers, in a series of pen-pictures, the life of the coal miner from his earliest childhood at the pit-mouth till, prematurely bent with age and breathless with asthma, he sinks into the grave. It is one of the most satisfactory sketches ever presented to the medical public, quite overshadowing the excellent supplement on the "Hygiene of Metal Mines," furnished by Rossiter W. Raymond, Ph. D., editor of the *Engineering and Mining Journal*, published in New York City.

Following these interesting papers is a contribution to the hackneyed themes of "Infant Mortality and Vital Statistics," from the pen of Dr. Thomas B. Curtis, of Boston. The wise conclusion to which the author finds himself carried, is that "the chief agencies at work to bring about the excessive mortality of infants are the ignorance and poverty which prevail so extensively among certain classes of all urban populations." For the relief of this, "reliance must be placed chiefly upon the philanthropic exertions of charitable associations organized for the express purpose of assisting parents to understand and carry

out the approved rules of infantile hygiene." And yet, it is not probable that even in this way would it be possible to effect any abiding change in the average results, for, as De Candolle and others have long ago said, the favoring conditions that are furnished by the organization of public and private charity "enables the weaker individuals to get along in life and to marry, whence results the generation of a stock of congenitally feeble infants. * * * In a high state of civilization such as is attained in the great cities of the present age, conditions of life exist which actually reverse the ordinary processes of natural selection and bring about the survival of the (physically) unfitted. These are enabled to live, to marry and to procreate; but their offspring, inheriting feeble or diseased constitutions, are necessarily short-lived."

Dr. Curtis' paper is full of suggestive material; but, like the majority of such writings, it in many particulars fails to go to the bottom of things and does not bring to the light those broad generalizations which sanitarians so persistently avoid.

Mr. Stephen P. Sharples, of Boston, Mass., contributes a brief compendium of the methods to be employed in detection of the adulteration of food. His testimony indicates the extreme difficulty which attends the effort to suppress such adulterations by statute law and also serves to encourage the belief that, after all, we are not in such danger from adulterated food as the professional alarmists would have us believe. He admits that "there has been no definite line laid down between good and bad meat." In fact, were there no competition between rendering establishments or fertilizer factories, we should hear very little about the existence of "emaciated beef," etc. that is unfit for fo od Eighty per cent. of the meat sent to the London market is the subject of tubercular disease, and, "to exclude it from the market would leave London without a meat supply." (*Brit. Med. Jour.*, Oct. 25, 1879, p. 647). As for milk, it is well known that water and burnt sugar are the only dangerous substances that are intentionally added to the fluid. When the milkman sells his watered milk for two cents a quart, while the pure article costs five or six cents, he is only gratifying that instinct of human nature which found expression in the sage

remark of the small boy, aged five, when his sister, aged three, undertook to remonstrate in an uproarious manner against the limited area of the pool of maple-syrup which had been deposited near the center of her plate by a careful parent. "Spread it, sister, spread it!" exclaimed the young philosopher, as he proceeded to apply a layer of sweetness to the entire upper surface of his own plate and to the greater part of his countenance as well. Children—and the majority of grown people are only children written large—like to get something bulky and showy when they invest their money. They would rather have a silver dollar than a gold dollar any time, even if it is really worth ten or fifteen cents less. Consequently, where it cannot be shown that the addition of water introduces anything poisonous into the milk, it is the wisest way to let the trade regulate itself in accordance with the natural law of supply and demand. Such methods, however, would not suit that fondness for the display of power which is the chief characteristic of the average official.

The important subject of "Public Nuisances" is treated by Roger S. Tracy, M.D., one of the sanitary inspectors of the New York board of health. His paper is written in a very temperate manner and is a valuable storehouse of observations regarding the annoyances incident to city life. Fortunately, while it appears to be impossible for any one to turn around in a crowd without shocking the delicate sensibilities of some one, the nuisances produced by the activities of a crowded population are less dangerous to health than might be supposed. "Impartial testimony, for example, goes to show that the disagreeable emanations from fat and bone boiling establishments are not injurious to health, but rather the contrary." (Vol. II, p. 381.) Again, "it might be presumed that substances collected in such a reckless and indiscriminate way as rags, would be a common means of propagating contagious disease, but I have never heard of or seen a case in which this occurred, nor have I been able to find any account of one in my reading." (p. 418.) Speaking of the various processes connected with the utilization of animal refuse, such as glue-making, bone-boiling, fertilizer-making, fat-boiling, etc., etc., the evidence is conclusively against the idea that the offensive odors emitted in these processes are deleterious to health

and the subject may be dismissed with the remark of the author that contrary opinions "coming from people who are trying to suppress a nuisance are naturally liable to be exaggerated and must be taken with allowance." (p. 426.) The author does not attempt to explain the manner in which living beings become tolerant of the most varied forms of discomfort; he merely enumerates the different nuisances and states their effect upon health. In fact, the adjustment of the human body to all kinds of noxious influences, so that they cease to operate injuriously, is a subject with which sanitarians seldom concern themselves.

"Quarantine" (with reference solely to sea-port towns) is ably discussed by the health officer of the port of New York, S. Oakley VanDerpoel, M.D., L.L.D. The subject possesses such interest and importance that we reserve the paper for a notice more extended than the limits of this review will permit. The secretary of the Louisiana State board of health contributes a disappointing essay on land quarantine, which seems to consist chiefly of a shallow argument in favor of throwing upon the national government the burdens which should be supported by State and civic organizations. The whole paper would do credit to its author as an argument addressed to the public through the periodical press; but in a volume like the present it is quite out of place.

Dr. Allan McLane Hamilton, of New York, the well-known author of a manual on nervous diseases, and Dr. Bachell E. Emmett have written the article on the "Management of Small-pox and other Contagious Diseases." Aside from considerable unnecessary descriptive matter pertaining to the diseases themselves, the essay is well written. It however, contains little that is new. In connection with the question of compulsory vaccination, the author very sensibly remarks, "Whatever may be the advantages of such a system abroad, it is certainly not suited to our own country. * * * It has been found, especially in New York, that an appeal to the common sense or fears of the public is sufficient, and that force is worse than useless. * * * Every year that passes shows an increased readiness upon the part of the lower classes to be vaccinated, and perhaps even in England the persuasive method would be the best, as it unques-

tionably is here." (p. 527). This is a principle which admits of almost indefinite extension in sanitary administration.

The "Hygiene of Syphilis" forms the subject of a brief and rather timid paper by Dr. F. R. Sturgis of New York. The author seems to be rather uncertain about the best course to pursue with reference to the suppression of syphilis, but he finally concludes that very little can be accomplished by the government "until a decided change takes place in the feeling and customs of the country." In other words, the matter is beyond the reach of all official intermeddling.

Dr. Elwyn Waller, chemist to the New York board of health, is the author of a valuable paper on Disinfectants, which may be considered the latest and perhaps the most authoritative utterance on the subject. It of course cannot be condensed for presentation in this review.

Dr. Tracy, the author of the paper on Public Nuisances, contributes another article entitled Village Sanitary Association. It has every where been found that, when the care of the health of the community has been abandoned to an official bureaucracy, matters soon relapse into their former condition. A general apathy and indifference settles down upon the authorities who have been specially charged with the work which properly belongs to every individual member of society, and the "public health" really deteriorates. Another evil, also, more frequently appears. The officials charged with the care of the "public health," find unnumbered opportunities for the initiation of costly public works — Fullerton avenue conduits, and their like — which are defended upon the ground of their alleged vital importance as means for the protection of the health of citizens. To save men from their saviors, and to diffuse real knowledge throughout the community, it is now found better to rely upon the independent voluntary efforts of citizens working together in the form of an association. This has been done with great advantage in several communities — notably in New Orleans during the past year. Dr. Tracy agreeably sketches the manner in which such associations may be formed, and the line of effort which they may pursue with advantage to the public.

The closing essay of the volume is written by Dr. D. F. Lin-

coln, of Boston. It consists chiefly of an application of the laws of hygiene to the individual care of children at school; and, though leaving scarcely anything to be desired, it calls for no special remark.

The unusual length of this review warns us against extended comment upon these volumes as a whole. They are not sufficiently condensed, and many subjects have really been considered by several of the essayists in succession. This was, however, inevitable, unless the editor had undertaken a closer revision than is usual under such circumstances. The work is a fine store-house of materials, gathered from the most varied sources; and will long remain the most convenient authority on all the subjects of which it treats. It is generally free from the extravagancies which characterize the writings of neophytes, though some of its contributors cannot always refrain from twanging the sanitary jews-harp. In spite of minor defects, the book will do a great deal of good, and should be carefully read by every physician. H. M. L.

ARTICLE X.—THE AMERICAN CYCLOPÆDIA OF DOMESTIC MEDICINE. Edited by S. P. Ford, M.D. 8 vo., 1215 pages. Chicago: E. P. Kingsley & Co., 1879.

This is an attempt to diffuse among the laity an acquaintance with the science of medicine and is the most successful effort of the kind we have seen.

The editor presents, in a popular manner, the principles that underlie the diagnosis and treatment of disease, and has given much space to hygiene. There seems to be a demand for such books, and while we may doubt the propriety of their publication, we must at least credit the editor of this with giving the people, along with much information, much sound advice. The tendency of the book will doubtless be to strengthen the regular profession and pull down the bulwarks of quackery. The necessity for a prompt appeal to the scientific physician and disastrous consequences that may follow the lead of the charlatan, are well stated on many pages. B.

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BOOKS AND PAMPHLETS RECEIVED.

Transactions of Illinois State Medical Society, May 20 and 21, 1879.

Infant Feeding and its Influence on Life, or the Causes and Prevention of Infant Mortality. By C. H. T. Routh, M.D. Third edition; 1879. Cloth, pp. 270. New York: Wm. Wood & Co. Chicago: W. T. Keener.

The Physician's Visiting List for 1880. Twenty-ninth year of its publication. Philadelphia: Lindsay & Blakiston.

Treatise on the Theory and Practice of Medicine. By John Syer Bristowe, M.D., London. Second American edition, revised by the author, with notes and additions by J. H. Hutchinson, M.D. 1879. Leather, pp. 1081 Philadelphia: H. C. Lea.

Transactions of the Medical Society of the State of Pennsylvania, at its Thirteenth Annual Session, May, 1879. Vol. XII, part II. Published by the Society.

Dr. Houts' Physician's Journal, Credit Book and Ledger. Third improved edition.

New and Improved Surgical Instruments. By J. G. Meachem, sr., M.D. Reprint from Transactions of Wisconsin State Medical Society.

Report of the Adams County Medical Society. By J. W. C. O'Neal, M.D. Reprint from the Transactions of the Medical Society of the State of Pennsylvania for 1879.

A Biographical Dictionary of Contemporary American Physicians and Surgeons. Edited by Wm. B. Atkinson, M.D. Second edition, enlarged and revised. Cloth, pp. 767. Philadelphia: D. G. Brinton. Chicago: Jansen, McClurg & Co. Price, $5.00 cloth; $6.00 leather.

Dictionary of German Terms used in Medicine. By Geo. R. Cutter, M.D. $3.00, cloth; 1879. New York: G. P. Putnam & Sons. Chicago: Jansen, McClurg & Co.

A Text Book of Physiology. By M. Foster, M.A., M.D. With illustrations. Third edition, revised. Cloth, pp. 720, price $3.50; sheep, $6.50. Cheaper students' edition to follow. London: McMillan & Co. Chicago: Jansen, McClurg & Co.

A NEW HEALTH RESORT.—The London *Medical Press and Circular* for Oct. 29, 1879, publishes as the title of one of its leaders, "Residence Abroad in Lung Consolidation!" We should prefer a residence at home in the "solid South."

Editorial.

A New Year and a New Volume.—The present number of the Medical Journal and Examiner marks the commencement of a new year, a new decade and a new volume.

So far as present indications can be interpreted, it also coincides with the commencement of a new era of prosperity in all departments of industry throughout our country, and of comparative health and comfort in all circles of society.

Hence it is an excellent time for all our old subscribers to renew their subscriptions, and for many new ones to send in their names and money, and thereby add the ample pages of the Journal and Examiner to their valuable sources from which to gather new thoughts and new resources to aid them in combatting disease and preserving human health and life. We shall do our best to make it worthy of the patronage of all members of the profession, and close this note by cordially wishing all our readers a *Happy New Year*. D.

The Metric System.—One strong argument in favor of hastening the universal adoption of the metric system of weights and measures by the medical profession, is the persistent tendency of printers to confound the old symbols for drachms and ounces, thereby making dangerous alterations in the proportion of ingredients entering into prescriptions. As samples, we saw in the first number of a new medical journal the following:

℞ Fl. ext. galii.....℥ii
Fl. ext. jaborandi..... } āā℥ss
Tinct. digitalis..... }
Nit. potassa.....℥ii
Mix; one teaspoonful at a dose.

If this should be literally copied for use by practitioners, they might soon find their patients presenting all the symptoms of the excessive action of the digitalis and jaborandi; to say nothing of the nitrate of potassa. Of course the two *drachms* of the fl. ext. of *galium* was intended to be two *ounces*. In another of our exchanges we saw a formula given in both methods, as follows:

℞ A. B.....	grams	8	=℥ii
C. D.....	"	16	=℥iii
E. F.....	"	32	=℥i

It is true, that such mistakes always arise from want of accuracy in the reading and correction of proof. But we have known the same mistakes to be made by druggists in filling prescriptions, in which the symbols for drachms and ounces both occurred. D.

EDITORIAL CHANGES.—Those who notice the external title page of this number of the JOURNAL AND EXAMINER, will see that the name of William H. Byford, A.M., M.D., has disappeared from the list of the corps of editors. When the *Chicago Medical Journal* and the *Medical Examiner*, were united and placed in the hands of the Chicago Medical Press Association, the directors of that organization selected Prof. Byford as the senior editor for a term of four years. He had completed his full term of service last month, and declined a re-appointment. His association with his colleagues during the entire four years has been pleasant and profitable. While they will miss his valuable counsel in the direction of their work, we trust the readers of the JOURNAL AND EXAMINER will continue to be favored with the perusal in its pages of such contributions as his time and ripe experience will enable him to make. D.

ILLINOIS STATE BOARD OF HEALTH AND THE ECLECTIC MEDICAL INSTITUTE OF CINCINNATI, OHIO.—At a meeting of the Illinois State Board of Health, held at the Grand Pacific Hotel, Chicago, on Thursday, Dec 11th, the status of the Eclectic Medical Institute was discussed. Since last June the diplomas of this school were not recognized by the board, owing to the

fact that it has two courses that count in graduation, in one year, which is contrary to a regulation of the board.

The institute was represented by Boutell and Waterman, of Chicago, as attorneys, and Drs. Scudder and Howe, Professors, of Cincinnati. The State was represented by the attorney-general.

The rule of the board, adopted in 1877, requiring each college to have but one graduating course a year, or its graduates would not be permitted to practice in this State, was gone over in all its phases. No result was arrived at until the evening session, when the following was submitted:

The Eclectic Medical Institute, of Cincinnati, represented here by Drs. Scudder and Howe, agree to abide by the propositions advanced in the rules of the said institute, which are, that three years of medical study are required before graduation, and two courses of lectures of twenty weeks each, and a period of sixteen months at least being occupied by said courses or collegiate instruction, and that the officers of the institute will give certificates to that effect to graduates of said institute, and that diplomas shall only be issued in June.

A. J. HOWE,
JOHN M. SCUDDER.

After deliberation, the following was passed:

Resolved, That in view of the foregoing, the diplomas of the Eclectic Medical Institute, of Cincinnati, will be recognized by this board.

The next meeting of the board will be held in Springfield, Jan. 8th, 1880.

THE selection, which appears on another page, entitled: "Is Phthisis Self-limiting?" by Dr. Wm. Porter, of St. Louis, is taken from the *St. Louis Medical and Surgical Journal.* The article was set up by us from advance proof-pages, and we only learn, as we go to press, the name of the journal in which the article appears as original matter.

Selections.

IS PHTHISIS SELF-LIMITING? By WM. PORTER, A.M., M.D., Read before the St. Louis Medical Society, Oct. 1877. From advance proof pages furnished by the author.

It is well known that at a recent meeting of the New York Academy of Medicine (May 1879), Prof. Flint asserted his belief in the self-limitation of phthisis (*Arch. of Med.*) This assertion was made so forcibly and sustained by such seemingly positive proof that it has thus far been received without recorded dissent. It being a subject of vital importance, with all respect for the learned author, we will examine his position from his own stand-point, and cite the cases which he has noted. The deductions that follow will thus be made upon ground already chosen.

Let us, then, gentlemen, receive the evidence purely upon its merits, forgetting, if possible, the high authority which we call in question. It is, moreover, right that a decision be reached in this matter, for if phthisis be self-limiting, this element must necessarily affect the result in no small degree; but if it is not, then must we look to therapeutic force and hygienic conditions for success.

At the outset, however, I cannot but echo Andrew Clarke's just tribute to our author, for he is "one from whom I have learned much; one whose acute powers of observation, whose largeness of experience, deserve the warmest gratitude of every student of pulmonary pathology." We revere and honor Flint; therefore, we shall deal freely and directly with his conclusions.

What is meant by self-limitation? So far as our argument is concerned, the definition given by Prof. Flint is well adapted. "A disease is self-limited when it ends in recovery, irrespective

of extrinsic influence derived from either hygiene or therapeutics."

We might almost rest our case here, for it will be at once conceded that the rule is that phthisis does not end in recovery, irrespective of extrinsic influence. To this rule there are few, if any, exceptions—certainly too few to affect the question. To these exceptions, however, our author points, and says they "are amply sufficient to substantiate the statement that in certain cases pneumonic phthisis ceases to be progressive, and may end in recovery from self-limitation." I will endeavor to prove to you, gentlemen, that phthisis is not, and cannot be, from its very nature, a self-limiting disease; and will ask you to examine with me briefly, first, whatever in the causation and pathology of phthisis relates to the subject; and, second, the clinical evidence adduced by Prof. Flint to substantiate his position.

Let us at the outset look for a working definition of phthisis. Flint, in the discourse mentioned, considers the "term pneumonic phthisis or pulmonary consumption as applicable to all cases of phthisical disease, exclusive of acute tuberculosis or interstitial pneumonia." Very true. What, then, is phthisical disease? A wasting, a constitutional disease, "a progression of symptoms, characterized," as Andrew Clarke has it (*New York Medical Record*, Dec. 14, 1878) by an ulcerative or suppurative destruction of a more or less circumscribed non-malignant deposit in the lung." The great factor back of all local manifestation is, then, the phthisical cachexia. Flint himself (Prac. Med. p. 289), admits the pathological fact that the pulmonary invasion is "the local expression of a general or constitutional morbid condition, the latter being the essential disease." He further says, "the great object of treatment, therefore, is the removal of this constitutional morbid condition or the tubercular cachexia. Measures addressed to the pulmonary affection are of secondary importance." How, gentlemen, can we believe that pulmonary phthisis, the local manifestation, is self-limiting, when back of it we have the tubercular cachexia? The author having taught that phthisis is the local expression of a cachexia, yet self-limiting, the deduction must be that the cachexia—this tubercular cachexia—is self-limiting also; in other words, that this condi-

tion, with its sequences, has an "intrinsic tendency to recovery irrespective of extrinsic influences derived from either hygiene or therapeutics." Is it any wonder that we turn from the *ipse dixit*, and call for proof ere we subscribe to this doctrine?

Let us glance at some of the causes of phthisis, and see if we can relegate to them a self-limiting tendency. Among these we have inheritability, age, climate, habits of life, poor food and exposure. Now, if from any of these causes—and these are the principal ones—a man has phthisis, is it reasonable to expect a limit from intrinsic influence? And if the man recovers, the cause being removed, is it not to this rather than to self-limitation that the result is due? When a patient with an inherited tendency to phthisis is so strengthened as to resist the advance of the disease, or by care and prudence lives beyond the dangerous decade; or weakened by an effeminating, changeable climate, seeks a better one, or exchanges a hurtful occupation for one more favoroble—there is a cause for the stay of the disease more tangible than "self-limitation." To such a cause will we find most, if not all, recoveries from phthisis are due.

A few words regarding the pathological characteristics of phthisis. Here I cannot serve my purpose better than to again quote from Prof. Flint (Prac. Med., p. 280): "The fact to be especially borne in mind is that pulmonary tuberculosis is not primarily and essentially an affection of the lungs. The tuberculous products proceed from a prior morbid condition of the system. It is a rational inference that a vice of assimilation is involved in the existing cachexia." Putting aside all disputed points as to the relation of true tubercle to phthisis (Prof. Flint using the terms phthisis and pulmonary tuberculosis in the same sense—(Prac. Med., p. 271), we have this succession which all admit—cachexia, mal-assimilation, pulmonary invasion. The latter impairs the respiratory function, and thus reacting upon the assimilative, the cachexia is further determined. The patient is thus inclosed in a morbid circle which can only be broken from without. Limitation must result from either repressing the cachexia, restoring assimilation, effecting retrogression of the pulmonary invasion, or all of these together. Tell me what is there intrinsic in this vicious circle which will cause it to break

itself? The rather, each link becoming its own cause, grows stronger through the others, and without extrinsic influence the disease progresses. In the very nature of cause and effect it cannot limit itself.

If, then, what we know of the causation and character of phthisis is opposed to the idea of self-limitation, let us examine the clinical evidence adduced in support of this theory.

Prof. Flint, in his well-known work on Phthisis (1875), records 670 cases of this disease, among which were 75 in which either recovery took place or the disease became latent; and his recent paper is founded upon their histories. Now, gentlemen, it is to those 75 cases that we must look for all the proof that has been given of the self-limitation of phthisis. By these, thus far, must the proposition stand or fall. We find that in 31 of these cases the statement is merely that "the disease ceased to progress for at least several months, and in the majority of cases for several years." By reference to the record we find that the last examination of each gave evidence that the disease was still present—latent in some, as may occur in phthisis, but not self-limited; for "a disease is self-limited when it ends in recovery," etc., and these had not recovered. As according to our author's own definition 31 of these cases have no definite bearing upon the point in question, we are restricted to the study of the remaining 44.

As self-limitation is independent "of extrinsic influence, derived from either hygiene or therapeutics," we at once decline the evidence of twenty-one of the forty-four cases, for in all of these pertinent and generally persistent treatment was pursued. Moreover, *three* of these cases subseqently proved fatal, and the last examination showed that at least a third of them had still physical signs of phthisis. We must object to these twenty-one histories as pertinent. The interest now centers in but twenty-three. "In fifteen of these cases hygienic measures constituted the treatment;" but these measures were of such a character as would lead us to hope for favorable results, viz., changes of business, out-door life, rest, sea voyages, change of climate, etc. These are potent aids, for as Flint says (Prac. Med., p. 290), "out of door life is of all measures most important." Now, to prove a disease self-limiting, we must eliminate whatever can be

reasonably traced to "either hygiene or therapeutics." These fifteen cases were given the advantage of favorable hygienic condition, and who shall say they would have recovered without these conditions? Having made use of that remedy which of all others has been found efficacious in phthisis, these fifteen cases are certainly not examples of self-limitation.

I have refrained from occupying your time with the details of the author's cases, which, in accordance with his own definition of limitation, have been refused as evidence. The history of these is fully given in his work on Phthisis, and I have endeavored to deal fairly and justly with the record.

Let us now apply the test to the eight cases which alone remain. These are numbered 1, 4, 7, 8, 14, 20, 23, and 24 (Phthisis, p. 187, *et seq.*) and are the only ones of which the author says "there was no medicinal treatment of importance, and no material change in the habits of life, the recovery taking place purely from an intrinsic tendency."

CASE I is that of a farmer who, having in the winter of 1842-'43, expectorated what were thought to be pulmonary calculi, was examined in June, 1843; "the only physical sign noted was feebleness of the respiratory murmur." He was in excellent health thirteen years after. "Prior to the development of the disease the patient had worked very hard on a farm. He left home for several weeks, and after relinquishing severe labor, engaged in buying and selling new lands in Illinois, a business which required much out of door life."

CASE VII is that of a constable, examined in April, 1856. Six years before he had had a hæmorrhage, and shortly afterward recurrent hæmoptysis for ten days. During the following year Prof. Flint met this man from time to time on the street, and he seemed to be in good health. As this man evidently had phthisis for six years prior to examination, what reason is there, in the absence of a later examination, to suppose that he had entirely recovered during the succeeding year? The statement that he seemed well will apply, at times, to many cases of chronic phthisis. "There is no further record of this case. The treatment consisted of cod liver oil for six weeks, generous living, the

use of malt liquors, and out of door life. Very good extrinsic influences, we take it.

In case XXIV. we find that the patient consulted Dr. Flint by letter, in 1859; was relieved of part of her duties as a teacher; took more out of door exercise; traveled in the summer. In 1862 had abnormal dullness, feeble respiration, and increase of resonance and whisper at the right summit. Afterward traveled in Europe; in 1868 had hæmoptysis; in 1869 increase of symptoms, and she died in the sping of 1871. Did this patient recover, and that without change of hygienic condition?

CASE IV.—A physician, aged 28, had hæmoptysis in October, 1852, and again in January and May, 1853. In May, 1853, he had slight dullness at the right summit, with weakened respiratory murmur and crackling, which accompanied inspiration and expiration. In September, 1854, he reported himself well, "a year after recovery:" i. e., his recovery must have dated from September, 1853, five months only after the above symptoms were noted. However, we find that in September, 1854, there was still "dullness at the right summit, and the respiratory murmur was feeble."

CASE XIV.—A physician, who had cough, hæmoptysis and slight loss of flesh, was examined October, 1857, and found to have evidences of phthisis at the left apex. Five years later Dr. Flint saw him in apparently good health. He had been drinking beer, living generously, with an abundance of exercise out of doors. It seems that in this case and in number IV, no medicinal agent was used, though the patients were physicians. They both had the influence of riding and driving in the open air while engaged in country practice.

The three remaining cases do, so far as recorded, seem to be instances of recovery from phthisis without medical or hygienic agency.

Number VIII was a clerk, examined in August, 1856, having had cough two months previously and hæmorrhage a week before. There was dullness and feeble respiration at the right apex and sub-crepitant râles on both sides. In October, 1856, he was reported well, and was in good health in 1871. The thought is

at once suggested, why did he, being examined at a time of greatest danger, not have medicinal treatment? The case is, however, one of great interest, and is certainly an exception to the general rule, as the disease appeared, progressed and abated within a period of five months.

The other two cases, XX and XXIII, furnish the best evidence in favor of self-limitation, though the record is very short. Two sisters, whose parents, three sisters and two brothers, had died of phthisis, were found, one with disease of the left apex, the other of the right. No remedy of importance was given, or change made in the habits of life. Both were well 15 years afterward. Again the question may be asked, why was not some form of treatment or change of condition ordered in these cases, as "no effort had been spared to save the lives of their sister and brothers; traveling, changes of climate, together with remedies having been resorted to in vain, although, perhaps, with the effect of retarding the progress of the disease." With this, however, we have nothing to do. The record is that these two sisters for whom nothing was done, alone recovered. Granting that these two cases and the one and possibly the three preceding ones show evidences of self-limitation, yet, we again quote from Prof. Flint's paper, "Self-limitation cannot be inferred from a single case or a very few cases."

Twenty years ago Prof. Flint advanced the idea of the self-limitation of phthisis (*Am. Jour. Med. Sci.*, 1858). A year ago the question was ably reopened by the same author. The conclusions made, though much quoted, have not as yet, as far as we know, been indorsed by any of the many observers and investigators of pulmonary disease. Is it possible that in all this time all others have overlooked this most important element in the progress of phthisis, to which attention has so long ago been called? Does not the etiology, pathology and termination of phthisis plainly teach that without extraneous influence, phthisis is progressive, limited only by death? Clinical evidence is certainly opposed to the doctrine of self-limitation, for we find that even in the large experience of its only advocate, among hundreds of recorded cases, that this doctrine is sustained by but few, and

in all fairness we confess a doubt as to the pertinence and value of most of these.

As Prof. Flint has placed the evidence before us, it is the right and duty of every physician to examine it, and to judge for himself. If phthisis is self-limiting, let it be proven so, for with the assertion comes the *onus probandi*. As yet we must believe that self-limitation is not an element in the character of the disease.

Though unwilling to admit that there is an intrinsic tendency in phthisis to recovery, yet we should not lose sight of the fact that many cases of phthisis respond to judicious treatment and hygienic conditions. In truth, in no other disease is careful scrutiny and constant care more necessary or better rewarded. Even were self-limitation ten times proven, it should not lessen the vigilance and attention which such cases demand. In all cases of phthisis two forces are at work—one aggressive and morbid with (as we believe) a direct tendency to death; the other defensive and systemic, opposed to and retarding the progress of disease. Whatever method of treatment is pursued, it and everything connected with it should tend to the building up of the system, and the increase of the powers of resistance to disease. In this we believe is the true limitation of phthisis.

MESSRS. DECAISNE, of Paris, have made certain experiments upon the head of a decapitated criminal, which demonstrate that the popular ideas respecting the survival of consciousness after the act of execution, are totally erroneous. The traditions which teach that certain heads have exhibited phenomena, in the winking of eye-lids, biting of lips, blushing, etc., belong evidently to the category of the ghost stories of the nursery. The Messrs. Decaisne, although experimenting upon the head immediately after the descent of the fatal axe, were unable to elicit the faintest evidence of vitality.

Summary.

PHYSIOLOGY.

ON THE ASSIMILATION OF MILK IN THE INTESTINES OF THE NEW BORN. By Forster. *Mitt d. Gesellschf. Morph zu. München*, March 6, 1879. *Revue des Sc. Méd.*, July, 1879.

These researches were made on a child four months old. The child took from 1,000 to 1,200 grams of a mixture of four parts of cow's milk and one part of thin rice water per day. Its weight increased about 150 grams a week. For eleven consecutive days the food eaten and the discharges were accurately weighed. During this time the child ingested 13.04 liters of the mixture, that is, 1.218 liters a day; the solid contents of which was 136.08 grams. These solids were utilized in the intestines of the child in the proportion of 6.35 per cent., that is to say double the quantity of what is utilized in the adult, but considerably inferior to that which is afforded by flesh. The fat was the element least readily absorbed. The fæces during the milk diet did not contain the least trace of albumen or sugar, but they contained from 30 to 40 per cent. of fat or fatty acids, and 34 per cent. of ash, one-third of which is represented by calcium. Large quantities of soap were found, especially earthy soaps. Of the 87.08 grams of ash in the milk taken during the eleven days, 32.01 were found in the fæces; and of the 13.56 grams of calcium, 13.34 grams were recovered. It may be calculated then that the body of the child retained 30 centigrams of calcium a day, or 2-01 grams a week, which corresponds to 19 grams of bone a week, or nearly a kilogram in a year.

ANNOUNCEMENTS FOR THE MONTH.

SOCIETY MEETINGS.

Chicago Medical Society—Mondays, Jan. 5 and 19.
West Chicago Medical Society—Mondays, Jan. 12 and 26.

CLINICS.

MONDAY.

Eye and Ear Infirmary—2 p. m., Ophthalmological, by Prof. Holmes; 3 p. m., Otological, by Prof. Jones.
Mercy Hospital—2 p. m., Surgical, by Prof. Andrews.
Rush Medical College—2 p. m., Dermatological and Venereal, by Prof. Hyde; 3 p. m., Medical, by Dr. Bridge.
Woman's Medical College—3 p. m., Diseases of the Chest, Prof. Ingals.

TUESDAY.

Cook County Hospital—2 to 4 p. m., Medical and Surgical Clinics.
Mercy Hospital—2 p. m., Medical, by Prof. Hollister.

WEDNESDAY.

Chicago Medical College—2 p. m., Eye and Ear, by Prof. Jones.
Rush Medical College—3:30 to 4:30 p. m., Diseases of the Chest, by Dr. E. Fletcher Ingals.

THURSDAY.

Chicago Medical College—2 p. m., Gynæcological, by Prof. Jenks.
Rush Medical College—3 p. m., Diseases of the Nervous System, by Prof. Lyman.
Eye and Ear Infirmary—2 p. m., Ophthalmological, by Dr. Hotz.
Woman's Medical College—3 p. m., Surgical, by Prof. Owens.

FRIDAY.

Cook County Hospital—2 to 4 p. m., Medical and Surgical Clinics.
Mercy Hospital—2 p. m., Medical, by Prof. Davis.

SATURDAY.

Rush Medical College—2 p. m., Surgical, by Prof. Gunn.
Chicago Medical College—2 p. m., Surgical, by Prof. Isham; 3 p. m., Neurological, by Prof. Jewell.
Woman's Medical College—11 a. m., Ophthalmological, by Prof. Montgomery; 2 p. m., Gynæcological, by Prof. Fitch.

Daily Clinics, from 2 to 4 p. m., at the Central Free Dispensary, and at the South Side Dispensary.